Ioan Abrudan
- Coordinator -

Proceedings

of the
6th Review of Management and Economic Engineering
International Management Conference

Performance Management or Management Performance?

20th-22nd September, 2018
Technical University of Cluj-Napoca
Romania

Organized by
A.M.I.E.R. (Romanian Managers and Economic Engineers Association)
Technical University of Cluj-Napoca
and
A.C.A.D.E.M.I.A. (Association of PhD advisers and Excellence
in Management and Business Engineering)

Todesco Publishing House

Asociația managerilor și a inginerilor economiști din România (A.M.I.E.R.)

Review of Management and Economic Engineering
Revista de Management și Inginerie Economică

UNIVERSITATEA TEHNICĂ DIN CLUJ-NAPOCA

Scientific Commitee

RMEE2018

Organizing Commitee

A.C.A.D.E.M.I.A.
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Todesco Publishing House
2018

ISSN 2247 – 8639
ISSN-L = 2247 - 8639

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Benefits and Concerns of Performance Management

INTENTIONALITY AND REALITY CONCERNING THE INVOLVEMENT OF PROFESSIONAL ASSOCIATIONS IN THE SECTORAL PERFORMANCE MANAGEMENT

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Abstract

Purpose *– The article proposes to management and academic professionals both to investigate less discussed issues at national level, specific to the role and functionality of professional associations within the framework of sectoral performance analyzes.*

Methodology/approach *– The approach is an exploratory one, based on the consultation of the specialized literature and the existing web resources.*

Findings *– There is a discrepancy between the two operational features contained in the title and a solution would be to reduce this difference by involving the academic environment more actively in mediating the interests of the various parties involved.*

Research limitations/implications *– The reduced volume of existing bibliographic resources does not sufficiently support some well-known and accepted findings, in terms of visible effects, analyzed by those directly involved in a particular industrial segment or the economic media.*

Practical implications *– The consequences of knowing as much as possible the issues raised by the title bring benefits for several categories of stakeholders both in the industrial environment (of a certain branch of activity in general) and in the academic environment.*

Originality/value *– Prerequisites are created for the realization of performance analyzes for different branches of activity as they exist at national level, as good practices, the global research carried out annually by the Romanian Academic Management Society (SAMRO) regarding the state of health of the Romanian management.*

Key words: association, profession, management, performance, network

Introduction

The existence of professional associations is a reality of the current society, justified, at first sight, by the intention of multiplying the possibilities of achieving a performance increase or, at least, an improvement. Through an extrapolation of a general presentation of the issue of management, it can be said that these organizational entities work through people for the people. In a world where management science has new development lines, it seems that the dynamics of the establishment of professional branches of industry or interdisciplinary maintains a somewhat direct proportionality. Thus, the problem of investigating their quantitative and qualitative contribution to sectoral performance management also arises, otherwise their existence and membership and affiliation of different stakeholders are not justified. At national level, compared to trends existing at EU or US level, it can be appreciated that the contribution of these associations to achieving performance is, as well as the level of operationalization of managerial science, a lower one.

From the point of view of understanding the main concept of this work, the senses given for the professional association by the Romanian management dictionary (Nicolescu, 2011, p.66) are relevant, as follows:

– the association is an organization made up of three or more people who, on the basis of an understanding, share, without the right to restitution, their material contribution, knowledge or input to work for the realization of a purpose that does not pursue personal or patrimonial benefits;

– the professional association is an association with legal personality, non-patrimonial purpose, constituted by natural persons, called members, belonging to the same related profession, which contribute both materially and through their knowledge and work to the achievement of the specific objectives.

A real thesis to be explored is the assertion by the same authors that the more a country is developed, the larger the number of associations with greater influence on the functioning of the society and the economy.

Contextualizing the issue

Without claiming an exhaustive approach, in an attempt to conceptualize the operating framework (organizational entities and relationships between different components) of a professional association, through Figure 1 we highlight the multitude of organizational actors involved, directly or peripherally within society, to the organization and functioning of a professional association, irrespective of the branch of activity. In a matrix analysis of power-interest type, one can emphasize for the first component, the determinant role of everything that means governmental and legislative institution, and for the second, institutions in the educational field.

Fig.1. Organizational and relational components specific to management of professional associations (processing after Green, B., 2015, p.9)

Even if the available information on the evidence of these organizations at national level is not found united, generically, from a quantitative point of view, things are good. According to the list of associations by field of activity - NACE codes in which the associations are categorized according to the last NACE code provided by the Ministry of Finance (http://www.asociatii.net/coduri-caen.html), we

find most areas of activity starting with 01 NACE code, agriculture, hunting and related services, which includes 383 associations. Although in this example there is a vast sector of activity, there is obviously a large degree of fragmentation that goes beyond the branch approach, and in many situations it is possible to associate having as a criterion a certain geographic area. Going forward within each category, with the existing classification structures, reaching an association in the field, in most cases we find outdated information or we are unable to find out about the activity of the wanted association, so that in a domain (main NACE code) it is relevant to study only the activity of 3-5 professional associations. The situation is much better in the case of associations that have a certain equivalent in economically competitive countries and also with a high level of implementation of managerial principles, methods and good practices. A relevant example in this respect is the professional associations in the field of project management. Thus, for internationally recognized associations (examples - Project Management Institute, International Project Management Association etc.), there are similar associations at national level (examples - Project Management Association Romania, Association of Management Consultants in Romania etc.).

Another important topic to be discussed in this framework is the analysis of the performance of professional associations. Organizations in a particular sector would be interested in having such a macro indicator to assess as accurately as possible the opportunity to join a particular professional association. And for associates it would be beneficial as a useful tool for benchmarking. For the decision-makers in the relevant ministries, relevance is given by the utility in performing diagnostic analyzes for certain issues of the respective sector of activity. In the absence of such an instrument, it is proposed as a preliminary form the approach in Table 1.

Table 1 Indicators of performance analysis of a professional association

Current no.	**Name of the indicator**	**Importance**	**Particularization**
1	A. Number of individuals	0,05	based on a registry for identification cards
2	B. Number of legal persons	0,2	when the entire organization is affiliated
3	C. Number of organized activities	0,15	over a year: conferences, training programs
4	D. Number of web page visits	0,05	within a year
5	E. Number of collaborations with universities	0,2	on a partnership or contract basis
6	F. Number of legislative initiatives	0,35	normative acts, promoted standards
			TOTAL SCORE

For an example of calculation for two professional associations that could be estimated as small and medium, on the basis of the proposed indicators (A.50/200; B.1/6; C.5/24; D. 100/1200; E.2/10; F.3/12), the total score would be 9.9 and 81 respectively.

Much more accuracy and robustness of the analysis would be obtained by considering 4-5 macro indicators (weights) detailed each by 2-3 sub-indices (the sum of their weights within the macro indicator considered to be 1) and applying a process of normalization of the original matrix built with data to compare the performance of some professional associations.

Performance and competitiveness within an industry depend, to an overwhelming extent, on the quality of the human resource that operates in different jobs that are specific to that field. A topical possibility to achieve this goal is through the establishment of protocols and cooperation agreements between universities and the business environment in which professional associations are involved, with a view to carrying out internships at different economic operators in the branch of activity. It is worth mentioning here that under the Human Capital Operational Program 2014-2020 (POCU), Priority Axis 6 - Education and Competencies, Thematic Objective 10 aims to improve the usefulness of education and training systems for the labor market, facilitate the transition from education to work and strengthening their education and training systems and their quality, including mechanisms for

anticipating skills, adapting curricula and creating and developing work-based learning systems, including dual learning and apprenticeship systems.

Another issue of interest would be to associate professional associations with major and topical issues of organizations, regardless of their type. Earlier this year, the Administrative Office of the Society for Industrial and Organizational Psychology (SIOP), the 14th Division of the Association of American Psychologists, published the list of the top ten topics of interest for American psychologists for 2018. According to the rankings based on the responses processed by more than 800 members of the organization, the ten topics of interest that resulted from the survey are, in descending order of importance, the following (http://www.apio.ro/tendinte-pentru-2018-in-domeniul-psihologiei-industriale-si-organizationale):

- "on-demand" work and contract work;
- automation of job positions and professional tasks;
- selection, training, professional development and retention of employees of the Y generation;
- adapting and improving leadership practices to new labor market requirements;
- algorithmic selection systems and the use of analytical methods in organizational decisions;
- changing the way employees prefer to work, adopting flexible work programs or remote work, integrating new technologies;
- the role of artificial intelligence and automatic learning in the organizational environment for assessing the personality and behavior of employees;
- the balance between personal and professional life and the well-being of employees;
- diversity, inclusiveness, equity in decision-making on staff selection and motivation;
- managing sexual harassment behaviors at work.

As can be seen from their simple enumeration, according to the quoted source, they influence the sectoral performance and solving or implementing some of them goes beyond the level of organizational autonomy, and a common point of view is needed at sector level. Professional associations, in their turn, as managerial entities, need to go through stages of updating the necessary knowledge in the activities undertaken.

Last but not least, from the point of view of the legal regulation of competition issues, participation in professional associations induces a certain level of risk for a company in terms of competition rules. It is important to be aware that the activities of the association and the behavior of members fall within the scope of Article 5 of the Competition Law and, as the case may be, Article 101 of the Treaty on the Functioning of the European Union, even if association itself or membership in an association is not a violation of the competition rules. In other words, mere association within a professional body does not provide protection to members by excluding them from the application of competition rules. It is emphasized in the specialized legal literature (Suliman, 2013) that the realization within an association of activities such as the conclusion of promotion partnerships among the members, through the association, participation in the events organized by the association for its members in order to relate and promote their own interests or by offering joint promotions with other members of the association or by mediating the association in order to promote a particular specialization or special competence existing among the members of the association may have a competitive impact because, in reality, they represent horizontal agreements or vertical agreements concluded between different economic agents, active on the same or on different relevant markets. Even if they start from a legitimate goal, that of meeting the proposed objectives of the association, certain behaviors or activities can be diverted and degenerate into agreed actions of competitors or non-competitors with anticompetitive impact on one or more relevant markets.

Conclusions

The article proposes to investigate the level of contribution of associations to finally professionalize the management of a domain. Working framework is an exploratory one, based on data and public analysis, being discussed as a case study and the example of some of them. It also interests the association of these associations with the academic environment and the peculiarities of their lifecycle, both from the marketing perspective and from the perspective of product and service engineering. To what extent do they really participate in the governance of the industry or the area of activity? The network is an omnipresent reality of the knowledge-based society, which we are increasingly demanding as a framework for presenting management relationships. At what level can we talk about

beneficial clustering in this regard? The results of the analysis indicate an insufficient maturation in this respect. The environment of managerial performance is influenced and fueled by good practices in terms of the functionality of the multinational industry and business segment. It is desirable to involve them more actively, especially on punctual activity indicators within the associations: elaboration of performance standards, promotion of internationalization of collaboration opportunities, correct dimensioning of public-private partnerships, increased contribution and involvement of the educational environment (in general, not only the academic one) etc. The activities of the professional associations can be catalysts for the performance management of the field of activity, determining, as a consequence, the management performance of the association as an organizational entity. It is also possible to identify part-by-side relationships, the fragmented approaches being not beneficial analysis solutions for any interested party.

References

Green, B.
2015
Understanding the value of professionals and professional bodies, Chartered Institute of Building (CIOB), available at https://www.ciob.org/sites/default/files/CIOB%20research%20-%20Professions%20Report.pdf, accessed March the 23rd, 2018.

Nicolescu, O. (general coordinator)
2011
Dicţionar de management. Bucureşti: ProUniversitaria

Suliman, C.
2013
Participarea la asociatii profesionale - un risc pentru o societate din perspectiva regulilor de concurenta?, available at https://www.hotnews.ro/stiri-concurenta-15470635-participarea-asociatii-profesionale-risc-pentru-societate-din-perspectiva-regulilor-concurenta.htm, accessed March the 21st, 2018

***http://www.apio.ro/tendinte-pentru-2018-in-domeniul-psihologiei-industriale-si-organizationale/blog/32, accessed March the 28th, 2018

PERFORMANCE ASSESSMENT AND THE ANALYSIS OF ITS INFLUENCING FACTORS IN ROMANIAN UNIVERSITIES BY USING MALMQUIST DEA: A CASE STUDY

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Abstract

Purpose *– This research illustrates the application of DEA models to evaluate the productivity growth of Faculties between the two terms of two different Presidents of the university.*

Methodology/approach *– The productivity changes and efficiency of the faculties over time have been analyzed using the Malmquist indices technique and output oriented Malmquist – DEA indices in estimating the productivity growth.*

Findings *– In the first period, between 2009 and 2012, the results show that only two faculties were more productive were in the last period than in the first one. In the second period, between 2013 and 2016, the results show that only one faculty were more productive.*

Research limitations/implications *– Universities can optimise their educational offer and the structure and size of the academic and non-academic staff for an efficient management performance.*

Practical implications – This investigation enables us to know how efficient faculties can be in terms of using various resources as compared with other faculties of the university. Moreover, it can help them to improve their performance by reallocating resources to maximize some key outputs.

Originality/value *– This research encourages us to say that the DEA approach can be considered as a tool for performance analysis in higher education.*

Key words: *Universities, Efficiency, Productivity*

Introduction

The efficiency and productivity of the public universities is important for getting high overall performance at institutional level. There are a several types of efficiencies in the public sector including financial, teaching, and research. Each one of these types of efficiencies is defined by its own inputs and outputs. In the higher education context, inputs such as the number of academic staff, non-academic staff, operational costs, infrastructure, and others, have contributed to teaching and research activities and outputs such as the number of undergraduates, graduates and Ph.D., number of publications, grants have indicated the quality and performance of higher education institutes. The selection of inputs and outputs depending on the goals towards how efficiency is assessed.

The productivity growth is synonymous with technical progress (or shifts in the technology boundary). However, productivity can no longer be interpreted as technical change unless there is either no technical inefficiency or unless technical inefficiency does not change over time (Worthington and Lee, 2008). The difference between efficiency and productivity would be interpreted as two measures which do not necessarily tell us the same story about the performance of an observation, especially over time. Efficiency measures the distance of an observation from the efficient boundary and productivity measures average product in the form of output per unit input (Thanassoulis, 2017).

This research illustrates the application of non-parametric DEA models in dynamic (time dependent) situations to evaluate the productivity growth of Faculties of the Technical University of Cluj-Napoca in Romania between the two terms of two different Presidents of the university. The performance

evaluation of public universities from Romania has been considered in this study using data collected from the reports released by each of the Presidents of the Technical University of Cluj-Napoca. The productivity changes and efficiency of the faculties over time have been analyzed using the Malmquist indices technique. We used the output oriented Malmquist – DEA indices in estimating the productivity growth from the data of the nine faculties of the Cluj-Napoca University between 2009-2012 for the first term and between 2013-2016 for the second term.

DEA-Malmquist productivity index

The concept of Malmquist index was first introduced by Sten Malmquist (1953), and has further been studied and developed in the non-parametric framework by several authors, for example: Fare at al. (1985), Caves at al. (1982), Fare at al. (1989), and Thrall (2000). It is an index representing Total Factor Productivity (TFP) growth of a Decision Making Unit (DMU), and it reflects progress or regress in efficiency alongside with the progress or regress of the frontier technology between two periods of time under the multiple inputs and multiple outputs (Cooper, Seiford, and Tone, 2007). Moreover, TFP is a ratio of total outputs to aggregate inputs, which provides an overall picture of the performance (Moradi-Motlagh and Jubb, 2016).

Following Fare at al. (1985) and Coelli (1996), the output-based Malmquist productivity change index can be formulated as:

(1) $$m_0(y_{t+1}, x_{t+1}, x_t, y_t) = \left(\frac{d_0^t(x_{t+1}, y_{t+1})}{d_0^t(x_t, y_t)} \times \frac{d_0^{t+1}(x_{t+1}, y_{t+1})}{d_0^{t+1}(x_t, y_t)} \right)^{\frac{1}{2}}$$

where the subscript “o” has been introduced to indicate an output-orientation and *m* represents the productivity of the production point (x_{t+1}, y_{t+1}) at period *t+1* technology relative to the production point (x_t, y_t) at period *t* technology and *d* are output distance functions. A value greater than one indicate positive TFP growth from period *t* to period *t+1*. An equivalent way of writing this index is:

(2) $$m_0(y_{t+1}, x_{t+1}, x_t, y_t) = \frac{d_0^{t+1}(x_{t+1}, y_{t+1})}{d_0^t(x_t, y_t)} \times \left(\frac{d_0^t(x_{t+1}, y_{t+1})}{d_0^{t+1}(x_{t+1}, y_{t+1})} \times \frac{d_0^t(x_t, y_t)}{d_0^{t+1}(x_t, y_t)} \right)^{\frac{1}{2}}$$

Total factor productivity EC - efficiency TC - technical progress

where *m* is the product of a measure of technical progress (TC) and a change in efficiency (EC) over the same period. In fact, this index is the geometric mean of two output-based Malmquist TFP indices. One index use period *t* technology and the other period *t+1* technology.

To calculate these indices it is necessary to solve the four component distance functions, which will involve four linear programs (similar to those conducted in calculating Farrell technical efficiency measures). The first two linear programs are where the technology and the observation to be evaluated are from the same period, and the solution value is less than or equal to unity. The second two linear programs occur where the reference technology is constructed from data in one period, whereas the observation to be evaluated is from another period (Coelli T. J., 1996).

Assuming constant returns to scale (CRS) technology to begin with, the following linear programs are used:

(3) $$[d_0^t(x_t, y_t)]^{-1} = \max_{\varphi, \lambda} \varphi,$$
$$\text{st} \quad -\varphi y_{it} + Y_t \lambda \geq 0$$
$$x_{it} - X_t \lambda \geq 0$$
$$\lambda \geq 0$$

$$[d_0^{t+1}(x_{t+1}, y_{t+1})]^{-1} = \max_{\varphi, \lambda} \varphi,$$

(4)

$$\begin{aligned} \text{st} \quad & -\emptyset y_{i,t+1} + Y_{t+1}\lambda \geq 0 \\ & x_{i,t+1} - X_{t+1}\lambda \geq 0 \\ & \lambda \geq 0 \end{aligned}$$

(5)

$$\begin{aligned} & [d_0^t(x_{t+1}, y_{t+1})]^{-1} = \max_{\emptyset,\lambda} \emptyset, \\ \text{st} \quad & -\emptyset y_{i,t+1} + Y_t\lambda \geq 0 \\ & x_{i,t+1} - X_t\lambda \geq 0 \\ & \lambda \geq 0 \end{aligned}$$

(6)

$$\begin{aligned} & [d_0^{t+1}(x_t, y_t)]^{-1} = \max_{\emptyset,\lambda} \emptyset, \\ \text{st} \quad & -\emptyset y_{i,t} + Y_{t+1}\lambda \geq 0 \\ & x_{it} - X_{t+1}\lambda \geq 0 \\ & \lambda \geq 0 \end{aligned}$$

where N represents faculties and each faculty consumes amounts of K inputs to produce M outputs. The *i*th faculty is represented by the vectors $x_i y_i$ and the (K×N) input matrix *X* and the (M×N) output matrix *Y* represents the data of all faculties of the university, Ø is a scalar and λ represents a vector of constants by size N×1.

In the second two linear programs, (5) and (6), where production points are compared to technologies from different time periods, the Ø parameter need not be ≥1, as it must be when calculating Farell efficiencies. The point could lie above the feasible production set. This will most likely occur in (5) where a production point from period t+1 is compared to technology in period t. If technical progress has occurred, then a value of Ø < 1 is possible. In the last linear program (6) it could also possible occur if technical regress has occurred, but this is less likely. Moreover, the Ø and λ's are likely to take different values in the above four linear programs and must be calculated for each faculty in the sample.

This approach can be extended by decomposing the (CRS) technical efficiency change into scale efficiency and pure (VRS) technical efficiency components. This will involve calculating further linear programs where the convexity constraint (N1' λ = 1) is introduced in each linear program. That is the distance functions calculated relative to a VRS technology (Coelli T. J., 1996).

Note that the VRS/CRS option has no influence on the Malmquist DEA because both are used to calculate the various distances used to construct the Malmquist indices. Thus, the measures of overall technical efficiency (EC) and pure technical efficiency (PEC) are obtained by running linear programs with the same data under a CRS (without convexity constraint) and VRS (with convexity constraint). Dividing EC by PEC then yields a measure of scale efficiency (SEC). Using these models, it is possible to provide five indices for each faculty and a measure of technical progress over time. These are: technical efficiency change (EC) (relative to a CRS technology); technological change (TC); pure technical efficiency change (PEC) (relative to a VRS technology); scale efficiency change (SEC); and total factor productivity (TFP) change. Note that TFP indicates the degree of productivity change, then if TFP > 1 productivity gains occur, whilst if TFP < 1 productivity losses occur. Regarding changes in efficiency, technical efficiency increases (decreases) if and only if EC is greater (less) than one. In the case of the technological change index is that technical progress (regress) has obtained if TC is greater (less) than one.

A major sources of productivity gains/losses can be made by comparing the value of EC and TC. If EC > TC then productivity gains are largely the result of improvements in efficiency, then if EC < TC productivity gains are primarily the result of technological progress. Furthermore, the overall technical efficiency is the product of pure technical efficiency (PEC) and scale efficiency (SEC), such that EC = PEC × SEC. If PEC > SEC then the major source of efficiency change (both increase and decrease) is an improvement in pure technical efficiency, whereas if PEC < SEC the major source of efficiency is an improvement in scale efficiency (Worthington & Lee, 2008).

Research Design

This application explores the assessment of performance and quality of the teaching process over time, which represents a priority in our academic environment. For this analysis, the nine faculties of the Technical University of Cluj-Napoca were selected in estimated the productivity changes and efficiency between the two terms of two different Presidents of the university. We used the Malmquist indices technique which is usually decomposed into a boundary catch-up effect, i.e. the changes in efficiency over time in each faculty, and the boundary shift of the best practice frontier over time typically due to changes in technology. The first term is further decomposed in pure technical efficiency and scale efficiency. The pure technical efficiency catch up component measures catch up relative to the VRS boundary. The scale efficiency catch up component measures how more or less scale efficient the DMU is in period 2 relative to period 1.

Table 1. The faculties of public university analysed in this study

Name	Description
DMU 1	Faculty of Architecture and Urban Planning
DMU 2	Faculty of Automation and Computer Science
DMU 3	Faculty of Civil Engineering
DMU 4	Faculty of Machine Buildings
DMU 5	Faculty of Electronics and Telecommunications and Information Technology
DMU 6	Faculty of Electrical Engineering
DMU 7	Faculty of Mechanical Engineering
DMU 8	Faculty of Materials and Environmental Engineering
DMU 9	Faculty of Buildings Services

The input variables taken into consideration are the ratio between the number of full-time academic staff and the total number of positions (in percent) and the ratio between the number of full-time non-academic staff and the total number of positions (in percent), whereas the total number of undergraduates and graduates enrolments and the total number of accredited programs in each faculty represent the output variables taken into account in the current study. The second output contains the bachelor programmes, master programmes and doctoral programmes.

The first input represents an important qualitative indicator in so far as it ensures the use of full-time staff in the teaching process. The increase or decrease of this indicator depends on following main causes: the evolution of the number of students, the setting of course and seminar groups consisting of a small number of students, which has led to the increase in the number of legally established teaching posts and the hiring, to a lesser extent, of full-time teaching staff of the teaching constituted teaching posts. The second input includes the number of persons which work for academic staff and students. In the case of outputs, the first output represents a funding indicator in the form of a state financed allocation for equivalent students, which brings 75 percent of the funding of the university. Moreover, the number of university students is a key indicator as the funding of the university depends on it and mainly applies to the students in the state financed categories. The second output includes all programs that work for students in universities and are taught by the teaching staff.

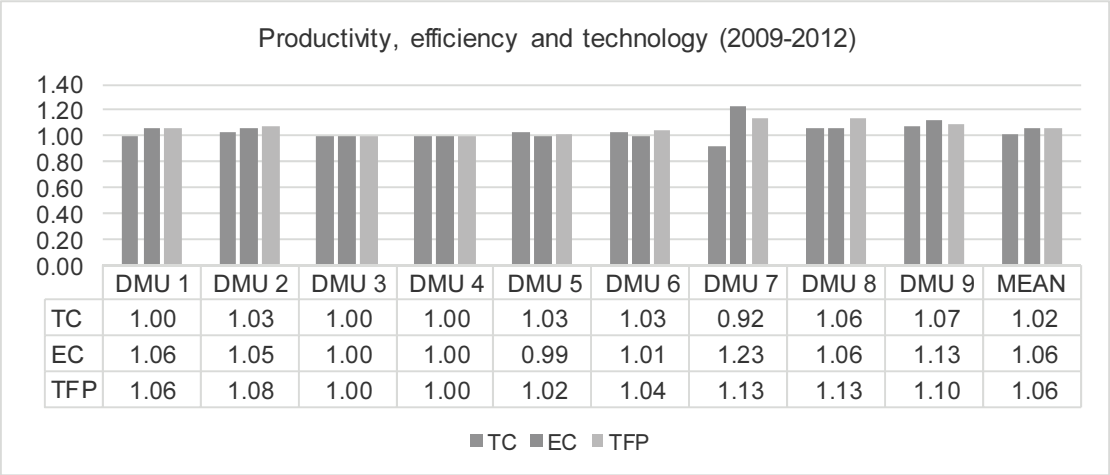
The sample used in this study covers nine faculties of the Technical University of Cluj-Napoca from data collected from the reports released on two terms of two different Presidents of the university (between 2009-2012 for the first term and between 2013-2016 for the second term). The output oriented Malmquist – DEA indices have been taken into account. In addition, we have also opted to use the PIM – DEA V3.2 software tool.

Discussion

In the first period, between 2009 and 2012, the results show that only two faculties were more productive (DMU1 and DMU8) in the last period than in the first one while five faculties were more productive (DMU2, DMU5, DMU6, DMU7 and DMU9) in the first period than in the last period. As a

result, out of the nine faculties three faculties were efficient (DMU1, DMU3 and DMU4) during the first period. However, the results obscure very different between all faculties. For example, Faculty of Materials and Environmental Engineering (DMU8) had a mean productivity improvement of 13 percent which was composed of a 6 percent improving in efficiency (moving towards the efficient frontier) and a 6 percent technological gain (movement in the frontier). Another aspect is that DMU8 is more productive in period 2 (between two academic years – 2010/2011 and 2011/2012) compared to period 1 (between the two academic years – 2009/2010 and 2010/2011) with 42 percent. In fact, this faculty had optimized much better resources to produce the two outputs: students and accredited programmes.

By way of comparison, Faculty of Buildings Services (DMU9) is more productive in period 1 compared to period 2 with 7 percent and this DMU had a mean productivity improvement of 10 percent during this period of time. While the DMU9 shows significant decline in efficiency in period 1 compared to period 2 with 50 percent, on the other hand, this faculty had significant increase in technological change of an approximately 60 percent in period 1 compared to period 2.



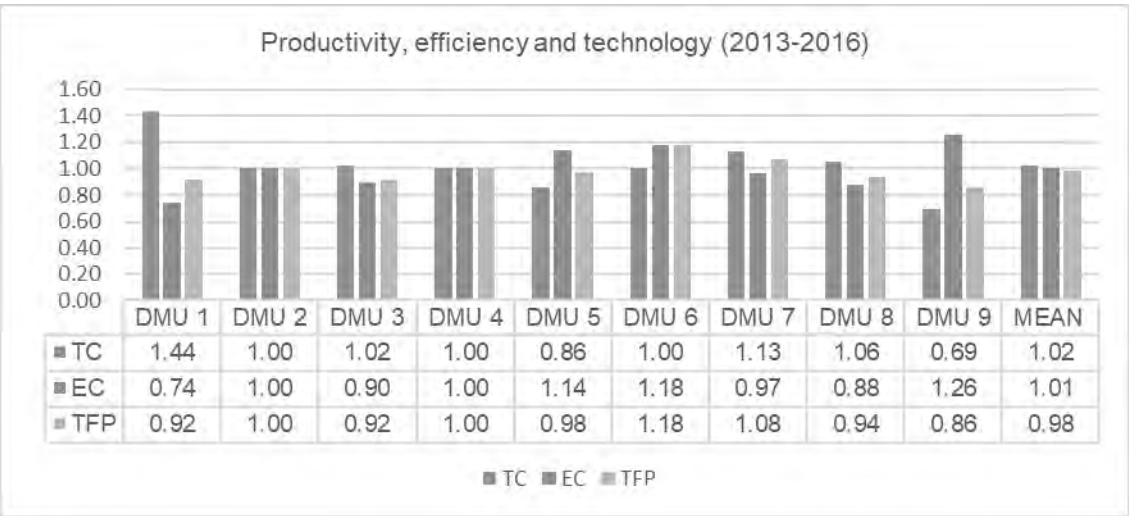
	DMU 1	DMU 2	DMU 3	DMU 4	DMU 5	DMU 6	DMU 7	DMU 8	DMU 9	MEAN
TC	1.00	1.03	1.00	1.00	1.03	1.03	0.92	1.06	1.07	1.02
EC	1.06	1.05	1.00	1.00	0.99	1.01	1.23	1.06	1.13	1.06
TFP	1.06	1.08	1.00	1.00	1.02	1.04	1.13	1.13	1.10	1.06

Figure 1. Changes in productivity, efficiency and technology (2009-2012)

Figure 1 shows that the biggest increase in productivity (more than 10 percent over the period) was for DMU7 and 8. The DMU7 shows significant increase in efficiency change but a low level of technological change while the DMU8 shows a constant increase in both efficiency and technological change.

In the second period, between 2013 and 2016, the results show that only a faculty (Faculty of Mechanical Engineering – DMU7) was more productive althroughout this period while two faculties (Faculty of Automation and Computer Science – DMU2 and Faculty of Machine Buildings – DMU4) were stable all the time. Moreover, out of the nine faculties two faculties were efficient (DMU2 and DMU4) during the second period. This means that they manage outputs better by increasing the number of undergraduates and graduates' enrolments and the number of accredited programs. The most inefficient DMUs seem to be DMU1 and DMU9 during in the second period.

By comparison with the first period, Faculty of Materials and Environmental Engineering (DMU8) had a mean productivity decline of 6 percent which was composed of a 12 percent declining in efficiency and a 6 percent improving technological gain between 2013 and 2016. Another aspect is that DMU8 is more productive in period 1 (between two academic years – 2013/2014 and 2014/2015) compared to period 2 (between two academic years – 2014/2015 and 2015/2016) with 29 percent. As a result, this faculty had not optimized fairly well resources to produce the two outputs, number of university students and number of accredited programs. In the case of Faculty of Buildings Services (DMU9), the productivity decline during this period.



	DMU 1	DMU 2	DMU 3	DMU 4	DMU 5	DMU 6	DMU 7	DMU 8	DMU 9	MEAN
TC	1.44	1.00	1.02	1.00	0.86	1.00	1.13	1.06	0.69	1.02
EC	0.74	1.00	0.90	1.00	1.14	1.18	0.97	0.88	1.26	1.01
TFP	0.92	1.00	0.92	1.00	0.98	1.18	1.08	0.94	0.86	0.98

Figure 2. Changes in productivity, efficiency and technology (2013-2016)

Figure 2 shows that five faculties experienced productivity decline over the period 2013-2016: DMU1 and DMU3 with 8 percent, DMU5 with 2 percent, DMU8 with 6 percent and DMU9 with 14 percent. In contrast, only two faculties experienced positive productivity growth, DMU6 and DMU7 while two faculties (DMU2 and DMU4) were stable during this period.

Conclusions

The aim of this paper was to investigate the application of DEA method for analysing the productivity and efficiency of public universities from Romania in two terms of two different Presidents of the university (between 2009-2012 for the first term and between 2013-2016 for the second term). Productivity change is decomposed to change in efficiency and technology to explore the source of productivity growth or decline for each faculty in a university. The results show that productivity growth increased, on average, by 6 percent over the first period but decreased by 2 percent over the second period. This change is attributed to technological regress, whereas individual faculty efficiency decline was not significant in the second period compared with the first. Technological progress as the main factor of productivity growth on average was only 2 percent and was steady over the two analysed terms. This fact can be explained by a lack or less used of IT technologies in teaching or could not keep up with changes in the private sector.

This type of investigation enables us to know how efficient and productive faculties can be in terms of using various resources as compared with other faculties of the university. Moreover, it can help them to improve their performance by reallocating resources to maximize some key outputs. This research encourages us to say that the DEA approach can be considered as a tool for performance analysis in higher education. The present study also aims to encourage universities to optimise their educational offer and the structure and size of the academic and non-academic staff for an efficient management performance.

References

Caves, D., Christensen, L., & Diewert, W.
1982
“The economic theory of index numbers and the measurement of input, output, and productivity”, Econometrica 50:6, pp.1393-1414.
Coelli, T. J.
1996
“A guide toDEAP Version 2.1: A data Envelopment Analysis (Computer) Program. CEPA Working Papers No.8/96”.

Coelli, T., Rao, P., & Battese, G.
1998
“An introduction to Efficiency and Productivity Analysis”, Boston, MA, Kluwer.
Cooper, W., Seiford, M., & Tone, K.
2007
“EFFICIENCY CHANGE OVER TIME”, In D. E. Analysis, Data Envelopment Analysis: A Comprehensive Text with Models, Applications, References and DEA-Solver Software (pp. 323 347). Springer US.
Fare, R., Grosskopf, S., & Lovell, C.
1985
“The measurement of Efficiency of Production”, Boston, Kluwer.
Fare, R., Grosskopf, S., Lindgren, B., & Roos, P.
1989
“Productivity developments in Swedish hospitals: A Malmquist output index approach”, In A. Charnes, W. Cooper, A. Lewin, & L. Seiford, Data envelopment analysis: Theory, methodology and applications. Boston: Kluwer Academic Publishers.
Malmquist, S.
1953
“Index numbers and indifference surfaces”, Trabajos de Estatistica 4 , pp.209-242.
Moradi-Motlagh, A., & Jubb, C.
2016
“Productivity analysis of Australian universities”, Pacific Accounting Review, Vol.28 pp.386-400.
Thrall R.M.
2000
“Measures in DEA with an Application to the Malmquist Index”, Journal of Productivity Analysis 13, pp.125-137.
Thanassoulis, E.
2017
“Performance Measurement using Data Envelopment Analysis” - the course at Aston University, Birmingam, U.K.
Worthington, A., & Lee, B.
2008
“Efficiency, technology and productivity change in Australian universities”, 1998-2003. Economics of Education Review 27, pp.285-298.

NEURO–LINGUISTIC PROGRAMMING AND MANAGEMENT PERFORMANCE

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Abstract

Purpose *– The purpose of this paper is to identify and present the most important aspects of Neuro – Linguistic Programming (NLP) methodology as an identified valuable tool for manager's competences development.*

Methodology/approach *– Several methodologies were used, for the focused results in this paper the life cycle identification of successful regional (self-standing) managers is considered. Semi –structured interviews where applied, together with NLP short sessions. The interviews were designed to identify the most important milestones and the busting components of the manager's evolution, like influencers or chronological events combination from childhood till present moment. The NLSP short sessions first enable the identification of the manager's vision over the strengths and weaknesses and, most important, their needs for future development. Secondly the NLP sessions help managers in understanding how the NLP mechanism really works, in order to use it as a valuable tool or techniques to solve a specific problem (they face) and to understand and evaluate how can be used NLP for their own development and for the organization sustainability*

Findings *– It was identify a semi-structured way in defining the managers' relevant background and motivations. In spite of the differences in background and motivations in all cases they have in common the understanding for the need of self–knowledge and self-development and therefore are open to new approaches.*

Research limitations/implications *– In spite of the higher understanding, the research biggest limitation is the managers' limited time for interviews and trainings, doubled by the limited or absent information regarding NLP, being a non-classical approach and therefor missing from any institutional managers training program.*

Practical implications *– NLP has many practical implications from decision making to negotiating, from better self -understanding, to better understand others and improving work place.*

Originality/value *– NLP is proved to be a very powerful tool with a wide range of applications. Now days, when economic conditions and working environments are very dynamic and constantly changing, challenges and expectations that managers face are hire. Learning new approaches, skills and abilities is a must have every manager in order to be better armed. And therefore NLP looks like a useful and swift applying set of knowledges, skills and abilities for any manager, no matter of the economical field, or organization size, or type of problems.*

Key words: *managers, abilities, neuro –linguistic programming;*

Introduction

The future of work and working places is going to look very different, as automation, robotics and artificial intelligence make many manual, repetitive jobs obsolete.

According to the McKinsey Global Institute, robots could replace 800 million jobs by 2030, while the World Economic Forum suggests a "skills revolution" could open up a raft of new opportunities. (2018)

“Anything that is routine or repetitive will be automated,” said Minouche Shafik, Director of the London School of Economics, in a session on “Saving Economic Globalization from Itself” at World Economic Forum, Davos, 2018. She also spoke of the importance of “the soft skills, creative skills. Research skills, the ability to find information, synthesized it, make something of it.” (2018)

In the context of this kind of economic changes and the rise of 4th Industrial Revolution, management itself and, of course, managers seem to be in trouble and not real prepared for.

Managers are still needed in 20 or 30 years? Or these jobs will be undertaken by artificial intelligence systems too? We don’t know! But, what we do know is that we need managers now and we need good managers capable to deal with nowadays reality.

Managers have to face many challenges coming from different directions: shareholders, markets, competitors, employees and so on. All these sources of challenge are dynamic and in constant change. In order to successfully deal with all these (create great compromises), managers must be very well prepared in many different ways.

The chance of failure is counter balanced by many different opportunities, but for the managers professional and career development, besides classical training is proposed an adjacent technique: Neuro –Linguistic Programming.

Neuro –Linguistic Programming

Neuro –Linguistic Programming (NLP) is an approach of human subjective experience aimed to understand and model performance and excellence.

NLP founders, John Grinder (linguist) and Richard Bandler (mathematician and specialist in computer programming) were, in the beginning of 1970’s interested in human behavior and communication.

They studied the so called *magic* behind these trying to understand how people think, act and communicate. As a result of their research they develop a model of formalized efficient communication patterns and they called it *Neuro-Linguistic Programming*.

We consider NLP as technique development in parallel with Informatics, the branch of information engineering that involves the practice of information processing and the engineering of information systems, studying the representation, processing, and communication of information in natural and engineered systems with computational, cognitive and social aspects.

When the NLP is dealing exclusively with people, Informatics considers the transformation of information - whether by computation or communication, whether by organisms or artifacts, combining the science of information and the engineering of information in natural and artificial systems, from biological molecules and electronic devices through nervous systems and computers and on to societies and large-scale distributed systems.

In time, John Grinder and Richard Bandler became interested in human performance and excellence, how these work and if excellence can be modeled and learned by other people. Their further researches on success and successful persons showed that performance and excellence can be modeled and learned by almost everybody. NLP is also known as *a model of excellence*.

The concept of Neuro –Linguistic Programming

NLP is a very complex (at the moment unstructured) model as complex as any other model that intents to understand and explain human communication and behavior.

Since 1970’s, many researches completed the model with new findings and other specialists brought their contributions to develop the initial *structure of magic*. Recent findings in neurosciences and brain studies based on progress of technology also provide solid arguments for what Grinder and Bandler et al. stated about how we think and communicate.

NLP model is based on a set of fundamental statements like:

- The map is not the territory;
- There is no failure, only feed –back;
- Any action has a purpose;
- If one wants to understand, must act;
- Modelling successful people can bring excellence.

The entire model is based on the assumption that people do not construct their life on the reality itself as much as on their perception of reality, perception that is completely subjective.

People perceive reality through their five senses (visual, aural, kinesthetic, olfactory and gustative), accordingly to their experience, values and beliefs they give a certain significance to the reality perceived and construct a response. The response they express as verbal or nonverbal communication, behavior or in other form is, consider NLP, entirely based on the subjective perception of reality.

The *subjective perception of reality* is the major field of NLP research.

NLP and subjective perspectives of reality

For the purpose of understanding how people develop their own perception of reality, Grinder and Bandler studied first, how people perceive reality through their senses. They discover that the way people perceive reality through their senses is different from person to person.

Then, they studied how people use information perceived through senses about objective reality to construct their subjective reality. The finding was that people use information very different (code, decode, select, combine, keep or delete) according to their own set of values and beliefs which are defined and act as filters. Each person has and uses a personal filtering system to understand the world around and to relate with other people. Each person construct a personal model of the world that is influenced the self-created filters. An optimal, efficient and effective interpersonal communication is made only if a common understanding and respect for the other person's model of the world exists.

Understanding how people construct their inner model of the world is a powerful tool that can be use either in a positive way, or a manipulative way, many professionals, including managers, can use this as a positive tool improving their own understanding of how others are seeing the world.

Managers and NLP

Managers are one of the professionals that have to deal with many peoples, all kind of people, and not only they have to work with others but also to manage to be productive, efficient and successful.

Success is not easy to be achieved, it is influenced by many internal and external factors. These factors are however, elements of internal or external reality. Using NLP model managers can better understand how they perceive reality and, how those factors influence their inner model of the world.

Interviews

As previously mentioned, interviews with managers were designed to explore this subjective perception of reality. Within the Interview's the questions are open allowing managers to elaborate their answers in many ways (redundancy is desired and encouraged), to tell more about their relevant experiences, sensations, state, or feelings and about persons that influence their development.

Talking about important milestones of their life, managers, like any person, can better understand what aspects they value, what beliefs guided their choices, can make connections between events,

and identify strengths and weaknesses and so on other relevant aspects that are revealing their being and expected reactions.

In the end of the interview, managers can choose an aspect of their professional life that want to understand better, to improve or even change completely. This aspect will be detailed and will make the object of neuro –linguistic programming short sessions.

Neuro –Linguistic Programing short session

In neuro –linguistic programming short session, manager discuses with neuro –linguistic programmer the aspect they chose, and with the adequate support and guided they analyze it. The entire evolution of the session is using NLP methods and sets an objective referring to chosen aspect. An example of usual objective is to improve the selected aspect (in manifestation or achieved results), or to modify it or even completely change it shaping a new structure or replace it with something else.

With the help of neuro –linguistic programmer, manager exercises NLP techniques appropriate to the established objective. Usually, two or three short sessions, at regular intervals are necessary to achieve an objective. After one month, a follow –up session is set to evaluate changes.

After appreciating and evaluating the results the Manager can chooses to work further with the same aspect to improve it even more, or move to another aspect being more aware about the technique potential, or by contrary deciding to finish the trainings and the sessions with the neuro –linguistic programmer.

Discussion and conclusions

Most of the aware Managers consider NLP approach very interesting and useful. Mostly they appreciate the cost effectiveness of the NLP techniques on one hand, but sometimes the identification of the most realistic (common accepted) truth is not so openly agreed, creating an exposure status, totally different from the secure image that each person's made about itself, and on other hand the missing of research that shows effectiveness on long terms ofer the possibility that a sort of mistrust to be expressed.

The same type of Managers appreciate questions from the interview to be challenging, creating a deep implication in the process, some of the questions (especially elaborated) forcing them to think of aspects they never really thought before. These elements of surprise (offered by the novelty of the aspects) increase the answers honesty and implicitly the reliability of the study and results.

Further work is needed to make NLP more popular among managers in Romania and to convince them of its positive impact for themselves, for the people they work with and for organizations. In this sense the Interviews will continue until the repeatability of the results indicates that all the major aspects are covered and a reliable life cycle curve, represented the managers evolutions is obtained. This curve could be used as a reference for the next stage of the research and typological analysis the identification of the Manager Status Score (MSS) and the primary list of identified aspects that must be considered.

The application of such approach may determine also the set of concerns regarding a specific Manger (person), the attitude that must be addressed, the potential of excellence and the road to be considered by the status change management process.

References

Bandler, Richard; Grinder, John
1975
„The Structure of Magic", Science and Behavior Books, Inc., Palo Alto, California, USA;
Dilts, Robert
2014
„Bazele programării neuro –lingvistice", editura Vidia, Bucureşti;
Dilts, Robert; Grinder, John; Bandler, Richard; DeLozier, Judith
2014
„Ghidul de programare neuro –lingvistică", editura Vidia, Bucureşti;
De Lassus, Rene
2004
„Programarea neuro –lingvistică şi arta comunicării", editura Teora, Bucureşti;
Gherasim, Melania, Pisla Adrian
2017
„Aplicarea NLP în Management", Raport de Cercetare Științifică, Universitatea Tehnică din Cluj-Napoca;
Knight, Sue
2004
„Tehnicile programării neuro-lingvistice", editura Curtea Veche, Bucureşti;
McLaren, Ian, R.
2000
„Communication Excellence –Using NLP To Supercharge Your Business Skills", Crown House Publishing Limited, Wales, England;
www.weforum.org/agenda/2018/top-quotes-from-davos-on-the-future-of-education

MANAGING ECOMMERCE PHYSICAL PRODUCTS INVENTORY BY MAKING ECOMMERCE PLATFORMS COMMUNICATING TOGETHER

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Abstract

Purpose *– Identifying how inventory data are stored in the most popular open source ecommerce platforms used worldwide.*

Methodology/approach *– Qualitative research methodology was used to find which are the common parameters in many open source ecommerce platforms, analyzing the database schema of the products tables and the user interface.*

Open Findings *– Analyzed ecommerce platforms have similar data requesting for listing a product, but the database scheme differs from one to another.*

Research limitations/implications *– The research is limited to open source platforms, where the access to the database can be done. Similarities found can be extended to SaaS platforms through API.*

Practical implications *– Providing an easy way to develop plugins and new software systems can help most of the online entrepreneurs and managers to have a better business and also their customers can have a better experience when shopping online. In our case, the performance of a manager can be defined by increasing the speed and quality of the data transfer processes.*

Originality/value *– Our major contributions are represented by the set of attributes which can define a physical product and also the availability of its correspondent name in the ecommerce platforms we have analyzed. This unique set can be used globally, improving the portability of data between the ecommerce platforms.*

Keywords: *Ecommerce inventory, ecommerce platforms, ecommerce taxonomy*

Introduction

Every online store owner needs big inventory of products and real time stock and price updates for being competitive in the actual global economy. The current study is made to develop a unique language for making the synchronization easier and faster. This type of working with a large database of products and partners across the supply chain can help managers to invest less in the psychical stocks and invest more resources for selling virtual products, which can be delivered directly from the supplier with a drop shipping business model.

The Actual research will be focused on identifying which is the terminology in various open source ecommerce platforms for the most important attributes of products and find a unique way to define the same data with a global identification key, for having a unique taxonomy to link a great number of online stores. We excluded the SaaS platforms at this stage because it is harder to develop extension for a platform hosted on a server where the access in the database or in the server side scripts can't be obtained. Ryan Gilmore considers that SaaS ecommerce platforms take a different approach. For a monthly subscription fee, merchants end up with a fully functional ecommerce platform that tends to be less technically complex than an open source ecommerce platform. (Gilmore, 2016). With the growth of drop-shipping business models, data synchronization between different suppliers is needed. In 2006 a scientific research made by Serguei Netessine and Nils Rudi conducted to conclusion that Retailers prefer the drop-shipping channel when the traditional channel has a transportation cost disadvantage

while drop-shipping is not too expensive (Netessine & Rudi, 2006). The actual drop-shipping business model mostly operates on LMSN (last-mile supply networks). The last mile term is used to supply chain management and transportation planning to describe the movement of people and goods from a transportation hub to a final destination in the home (Goodman, 2005; Goodman, 2005). Advantages of managing the inventory across the supply chain made the scientist design and improve the architecture of goods between suppliers and retailers. Lim & Srai consider that traditional structural focus reveals contradictory last-mile performance in practice; it influences the other dimensions and requires a reciprocal "fit" to deliver high performance. Retailers cannot replicate a network structure (often observable) without adjusting other dimensions that might be less observable (Lim & Srai, 2018).

Other need of inventory data transfer could also improve the omni-channel experience for consumers. After making a literature review, researchers found that omni-channel retailing is intellectually based on analytical models, the strategic influence of the internet, channel and multi-channel management/retailing as well as channel- and multi-channel customer behavior. These areas build the foundations for the identified research themes of channel supply and demand side (including logistics and supply chain and operations) as well as channel management and strategy (including customer channel behavior and channel choice) (Galipoglu, et al., 2018).

Materials and methods

The research started with 5 local companies that integrate at least one system which inserts or updates data from other online systems, including local or international suppliers. After making an interview of 60 minutes we analyzed the replies and found how they wish to proceed when they want to add or update products on their online store, products that are not held in their warehouse. The business managers who participated in the interview use local platforms like Webeshop or opensource platforms like Opencart and CS-Cart.

The second stage of the research was to identify the most well-known ecommerce platforms used world-wide. For making a short list of the popular platforms data from Google, Similar Tech and Alexa were requested through the online platforms they have. Adwords Keyword Planner delivers performance indicators which were used to find a top of the most popular platforms.

Average monthly searches, according to Google, are the average searches of a keyword and close variants based on the selected targeting options and the selected dates. (Google Keyword Planner, 2018). The competition indicator is defined like the number of companies that were shown per keyword for all searches available on Google (Google Keyword Planner, 2018). The second source of data used was Similar Tech, a system which maintains a database of 3,120,251 online sales websites and identified 132 different ecommerce platforms (Similar Tech, 2018). The third source of data used was requested to Alexa.com. According to the company, Alexa's traffic estimates and ranks are based on the browsing behavior of people in our global data panel which is a sample of all internet users. Alexa's Traffic Ranks are based on the traffic data provided by users in Alexa's global data panel over a rolling 3 months period. Traffic Ranks are updated daily. A site's ranking is based on a combined measure of Unique Visitors and Pageviews. Unique Visitors are determined by the number of unique Alexa users who visit a site on a given day. Pageviews are the total number of Alexa user URL requests for a site. (Alexa.com, 2018).

All data collected were used to discover the most successful ecommerce open source platforms, determined by formula 1, which calculates PS KPI (Platform Success KPI), a key performance indicator which identified the most popular platform used for our qualitative research.

$$\text{PS KPI} = \frac{\text{Number of stores}}{\text{Average stores number}} + \frac{\text{Monthly searches}}{\text{Average monthly searches}} + \frac{\text{Competition indicator}}{\text{Average competition}} \quad (1)$$

For obtaining the results of our research, we analyzed databases schema and user admin interface of the platforms mentioned in the shortlist and identified the common attributes mentioned for every physical product. This research process in the most popular ecommerce platforms could help us develop a system based on actual web technologies. Creating a unique name for the most usual attributes of the physical products can empower the developers and business managers integrate faster more products in their stores and update the products they list in their store. After finding the usual parameters defined by their availability in database or in the user's interface, we grouped them so as to be able to describe a more flexible and popular schema.

Results

In figure 1 we can observe the process of importing or updating products from two different online ecommerce platforms. According to the business owners we discussed about, this process takes place each time when they onboard a new partner in their platform, the difference is because each product and data supplier gives different data in different format. This difference consumes many developing resources. The process described in figure 1 can be used for selling goods directly from warehouse (drop shipping) or reselling the products after ordering them from the supplier (e-tailing) or in an online market place. According to Collins English Dictionary e-tailing means retail conducted via the Internet (Collins Dictionaries, 2014).

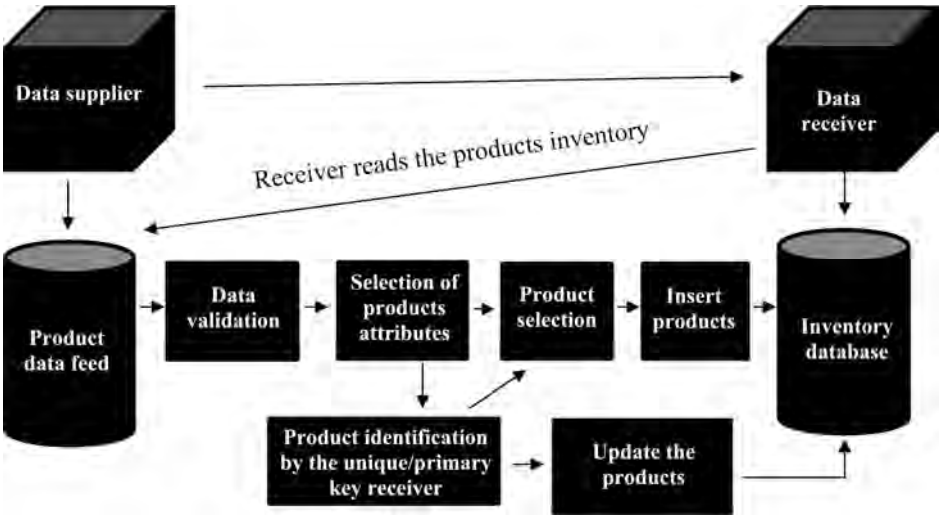

Figure 1 - Import and update the products from two online platforms

Table 1 – List of the most popular open source platforms

Platform Website	Deployments	Average searches	Competition indicator	PS KPI
woocommerce.com	951879	60500	0.0700	7.5663
magento.com	380510	165000	0.1500	4.9594
oscommerce.com	73318	5400	0.4300	2.9196
zen-cart.com	137434	9900	0.1300	1.7608
prestashop.com	202354	12100	0.0300	1.6846
virtuemart.net	111594	880	0.1100	1.3898
x-cart.com	54300	12100	0.1500	1.3106
opencart.com	35234	14800	0.1000	0.9275
cs-cart.com	3479	12100	0.0900	0.6269
spreecommerce.org	10067	720	0.0100	0.1316

Table 2 presents the results of most popular opensource ecommerce platforms across the world. The most popular open source platform is Woocommerce, followed by Magento and OsCommerce, Zen-cart, Prestashop, VirtueMart, X-cart, OpenCart, Cs-Cart, Spree Commerce. The results were used to make a qualitative research on each ecommerce platform and we discovered that the usual non-customized fields for inserting a new product in all stores are 36. The research confirmed that on a different platform, the parameters have different names and also these results are reflected in the database too. The correspondence for each platform is as follows:

- 2 parameters are found in all 10 platforms (category, image, price).
- In 9 platforms we found the product's name, date available and weight.
- 8 platforms have fields for description, gallery, stock quantity, special/promo price

- Stock status and SKU are found in 7 platforms.
- The short description of a product is used by 6 ecommerce apps
- Manufacture, custom configurable attributes, tags, length, width, height and Ean13 identification code type are found in 5 platforms.
- Minimum quantity is found in 4 platforms.
- Model is found in 3 ecommerce scripts, at those platforms which don't have a product name, this parameter is used.
- Maximum quantity is found in 2 platforms, and all platforms used the identification code type ISBN, UPC and MPN and also the location of the product.
- At least one platform has the country of manufacture, special field for video content, delivery time, product packing + measure unit, quantity in box, promo text and the code identification EAN, JAN, GTIN.

Table 2 – Summary of the data types found in top ten ecommerce platforms

Category	Generic field name	Appears in
Product details	Name	9 platforms
Product details	Model	3 platforms
Product details	Manufacturer	5 platforms
Product details	Short description	6 platforms
Product details	Description	8 platforms
Product details	Category	10 platforms
Product details	Custom Attributes	5 platforms
Product details	Image	10 platforms
Product details	Gallery	8 platforms
Product details	Tags	5 platforms
Product details	Location manufacture	1 platform
Product details	Video	1 platform
Stock & Availability	Data Available	9 platforms
Stock & Availability	Stock status	7 platforms
Stock & Availability	Stock Quantity	8 platforms
Stock & Availability	Minimum quantity	4 platforms
Stock & Availability	Maximum quantity	2 platforms
Stock & Availability	Delivery time	1 platform
Stock & Availability	Location	2 platforms
Commercial	Price	10 platforms
Commercial	Special price	8 platforms
Commercial	Promo text	1 platform
Box	Weight	9 platforms
Box	Length	5 platforms
Box	Width	5 platforms
Box	Height	5 platforms
Box	Product packing + measure unit	1 platform
Box	Quantity in box	1 platform
Identification	SKU	7 platforms
Identification	EAN	1 platform
Identification	ISBN	2 platforms
Identification	UPC	2 platforms
Identification	JAN	1 platform
Identification	EAN13	5 platforms
Identification	GTIN	1 platform
Identification	MPN	2 platforms

All analyzed platforms generate a unique link after inserting the product. We have probably to consider that some fields can be added by the custom fields option. After listing the results, we used all information about fields available to group them in some categories. All 38 types of data can be grouped in 4 main categories, such as:

- Product details will group 12 types of data + the auto generated link, this kind of data will describe the physical product.
- Stock & Availability will describe the quantity available and also the available date and delivery time, there were identified 7 types of data.
- Box category will contain information about the package of each product, mostly used for charging the delivery fee and other logistics processes. At this category there are listed 6 types of data.
- Identification is a different category that gives a unique code accepted by different organizations for identifying a product for example SKU or other specific codes. According to William et al. a stock-keeping unit is an individually identifiable item stored in a specific location and tracked by an inventory system (Sawaya & Giauque, 1986).
- The last and also probably the most important category of data identified was the commercial one, here we had just 3 types of data.

A summary of the research in the top ten platforms that were analyzed can be found in table 2, all mentioned fields are based on a generic name based on the most popular name mentioned in the researched ecommerce platforms.

Discussion and conclusions

After analyzing the most successful identified open source platforms across the world and analyzing each platform with a default configuration, our research can bring us to discuss how the data are used for obtaining some commercial advantages. The import and update of the product data between the supply chain open many opportunities for entrepreneurs. They can share all the data, having a big inventory of products and sale more products that can't be kept in stock through drop shipping business model. Also, this type of communication between different platforms types can update rapidly the prices and the stocks, having a good feedback for client and avoid fines from local authorities.

The current study identified which are the most successful ecommerce platforms and how the data are described in different ecommerce platforms, but the actual challenge will be this unique way to describe all those parameters identified to be recommended and integrated in various platform types for a better and faster communication. The XML standard can be used for making a global format accepted by the entrepreneurs, developers and managers, each filed meaning the same data type. Extensible Markup Language (XML) is a markup language that defines a set of rules for encoding documents in a format that is both human-readable and machine-readable. XML Schema is used to define schema of XML documents that have become standards for data exchange in various Web-based information applications (Hsu, et al., 2014). After the research was finished, it was found that many fields are named in various ways and also the real attributes, that can describe digitally each product, are very different; in 10 ecommerce platforms we found 36 standard fields, but online 3 common parameters (category, image, price). Also, the unique link is present in all platforms, auto generated by each platform. This means that the web technologies imposed a way to have a unique URL for every product.

Observing the actual state of ecommerce, details about products can also be used for integrating data in content of any advertising aggregators. The seller can deliver a feed (XML or CSV) but he must be very careful as regards the choice of the right keywords and phrases that will be used by the customers when searching for the particular product (Fasuga, et al., 2014).

The most important conclusion of the research is that data is defined in many ways and also at this moment it can't be identified a general way for describing a physical product in database in the same way. The discussion is about the practical result of our findings: would the business model need a general way for synchronizing many systems or would they prefer to focus their resources on other tasks?

We consider that, in digital age, all SMEs should try to reduce the cost and automatize everything they can for being competitive in near future.

References

Alexa.com
2018
How are Alexa's traffic rankings determined?. [Interactiv]
Available at: https://support.alexa.com/hc/en-us/articles/200449744-How-are-Alexa-s-traffic-rankings-determined- [Accessed 24 02 2018].

Collins Dictionaries
2014
Collins English Dictionary, 12th Edition. s.l.:Collins - GB.

Fasuga, R., Stoklasa, P. & Němec, M.
2014
The Method of Automated Monitoring of Product Prices and Market Position Determination in Relation to Competition Quotes.

Galipoglu, E., Teller, C., Hüseyinoglu, I. O. Y. & Pöppelbuß, J.
2018
Omni-channel retailing research – state of the art and intellectual foundation. *International Journal of Physical Distribution & Logistics Management.*

Gilmore, R.
2016
Bright Pearl. [Interactiv] Available at: https://blog.brightpearl.com/saas-vs.-open-source-an-introductory-comparison[Accessed 20 02 2018].

Goodman, R. W.
2005
Whatever You Call It, Just Don't Think of Last-Mile Logistics, Last, s.l.: Global Llogistics & Supply Chain Strategies.

Google Keyword Planner
2018
Google Adwords - Keyword Planner. [Interactiv] Available at: https://adwords.google.com/ko/KeywordPlanner/Home?__c=5645055681&__u=2115937821&authuser=0&__o=cues#start [Accessed 18 02 2018].

Hsu, I.-C., Lee, J. Y., Huang, D.-C. & Lai, K.-Y.
2014
Integrating Semantic Web technologies with XML Schema using role-mapping annotations. *The Electronic Library,* 32(2), pp. 147-169.

Lim, S. F. W. & Srai, J. S.
2018
Examining the anatomy of last-mile distribution in e-commerce omnichannel retailing: A supply network configuration approach. *International Journal of Operations & Production Management.*

Netessine, S. & Rudi, N.
2006
Supply Chain Choice on the Internet. *Management Science,* Volumul Vol. 52, No. 6, p. 844–864.

Sawaya, J. W. & Giauque, C. W.
1986
Production and Operations Management. s.l.:Harcourt Brace Jovanovich.

Similar Tech
2018
SimilarTech. [Interactiv] Available at: https://www.similartech.com/categories/ecommerce-platforms [Accessed 18 02 2018].

THE INFLUENCE OF INTERRUPTING THE FUNCTIONING OF STOPES UPON LABOUR PLANNED RATE

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Abstract

Purpose *– The profitableness of mining activities is not a new problem.*

Methodology/approach *- The labour consumption generated by the cutter loaders might be generated both during the functioning periods of the stopes and during other periods, including revisions, repairs, transportation etc. In the case of the labour consumptions determined during the functioning period of the stope, the labour consumptions resulting when work is interrupted should be mainly insisted upon.*

Findings *– Mining, as one of the world's earliest industrial activities, continues to yield minerals and resources both valuable and fundamental to civilization.*

Research limitations/implications *– This work analyses the activity of a mechanized mining, systematizing functioning breaks.*

Practical implications *– The causes determining the breaks have been analysed and mathematical functions have been established for them.*

Originality/value *– The results of the study help managers to co-ordinate the activities according to the overlapping of certain breaks and reorganize the activity depending on such overlapping.*

Key words*: stopes, breaks, mining.*

Collecting systematizing the data

Photo-chronometry represents photographing the groups of operations belonging to processes or to the stage of simple processes and timing the groups of operations that deviate from normal balance. Photo-chronometry, though less precise, allows the getting of preliminary data required by the analysis of the manner production processes are carried out.

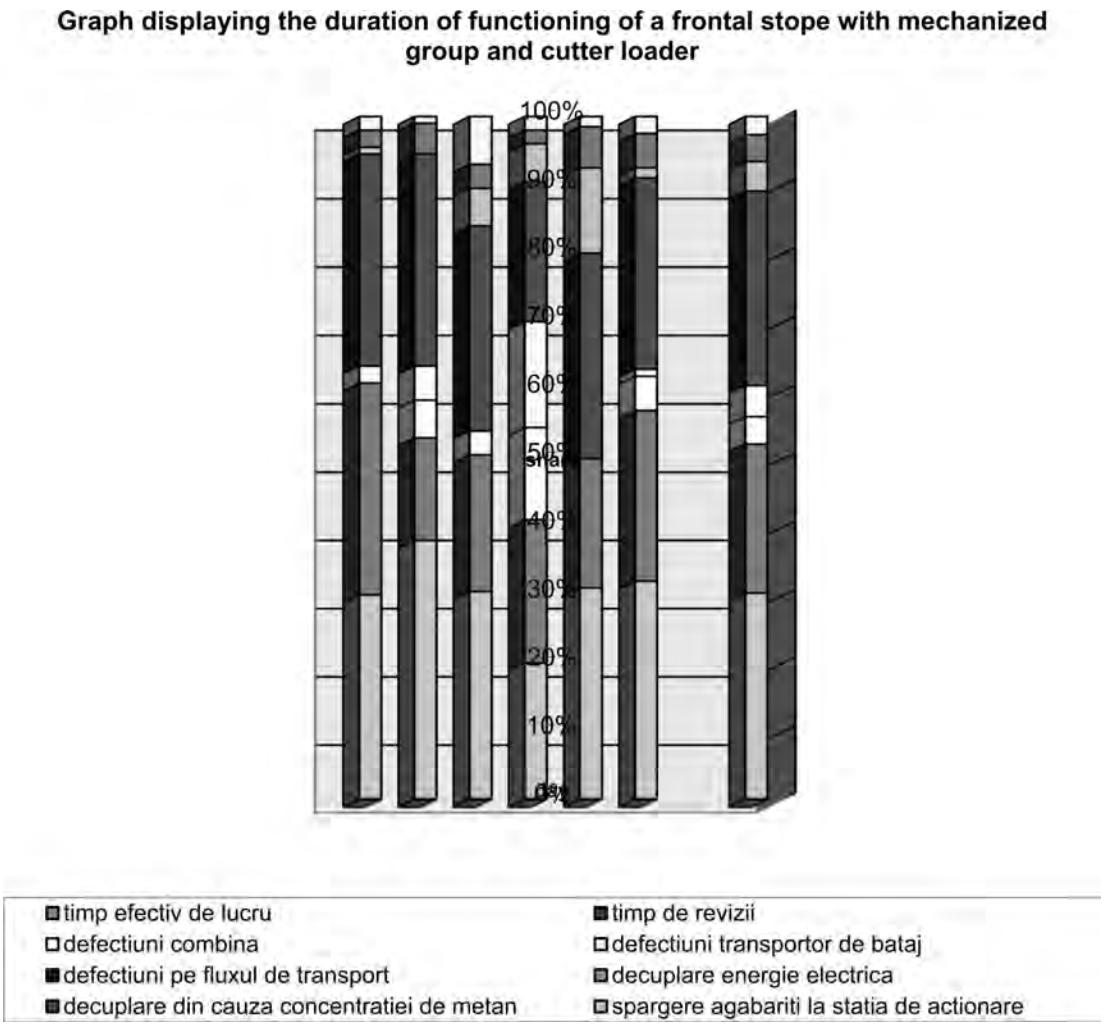
Photo-chronometry may be employed for the labour deployed by one or several workers as well as for the functioning time of the equipment.

During the six days of observations made at Paroseni Mining unit, the following data resulted:

- Number of shifts analysed through photo-chronometry:
  - 24 shifts;
- Advancement along the work front:
  - Total 6. 50 m;
  - Daily average 1. 08 m;
- Average duration of a cycle 0. 63 m:
  - 14 hours;
- Number of cutting cycles of 0. 63 m per day:
  - 1,71 cycles;
- Planned work places:
  - Total 266.45 work places;
  - Average per day 44.40 work places;

    - Average per shift 11.10 work places;
- Planned production:
    - Total 3900 t
    - Average per day 650 t
    - Average per shift 162.5 t
- Production obtained:
    - Total 4328 t;
    - Average per day 721.33 t
    - Average per shift 80.33 t;
- Labour productivity:
    - Planned 11.62 t/ job;
    - Obtained 14.55 t/ job;
- Stope's total non-functioning time:
    - Total 4112 min;
    - Average per day 685 min ~ 48 % ;
    - Average per shift 171 min
- Stope's non-functioning time determined by the efficiency of the equipment belonging to the transportation flux;
    - Total 2607 min;
    - Average per day 434 min ~ 30%;
    - Average per shift 109 min;
- Stope's non-functioning time determined by the revisions of the stope's transportation flux:
    - Total 1904 min;
    - Average per day 317 min ~ 22%;
    - Average per shift 79 min;
- Stope's non-functioning time determined by methane accumulations:
    - Total 755 min;
    - Average per day 125 min ~ 9%;
    - Average per shift 31 min;
- Stope's non-functioning time due to various causes:
    - Total 2628 min;
    - Average per day 438 min ~ 30%;
    - Average per shift 110 min.

These data are displayed by Fig. 1.



- Real work time
- Failures of cutter loader
- Failures on the transport flux
- Decoupling due to methane concentration
- Revisions
- Failures of the stope transporter
- Decoupling electrical energy
- Oversized breakage at the drive station

Fig. 1. Failures of stope transporter

Interpretation of the interruptions occurring within mechanized stopes

These items of information collected during several months have been systematized in the following table:

Day	Description of interruption (failure)	Hour the interruption occurred – hour it was repaired	Cause of interruption	Duration of interruption (min)
1	Change of gear spindle box TR –7A	4.10 – 17.30	Tr	800
2	Change of reduction and gear box TR – 7A	5.20 – 18.50	Tr	810
3	Change of cutter loader's slipper	10 – 11.20	Cs	80
4	Wet motor of the cutter loader	2.35- 4.55	Cm	140
5	Change of claw and Duriflex at TR -7A, checking of gear box	6.15 – 10.30	Tc	255
6	TR –7A blocked. Crumbling.	7.05 – 14.35	S+T	450
7	TR –7A blocked. Crumbling.	11.20 – 14.05	S+T	165
8	Crumbling + blocking TR-7A C83-C84	10.15-17	S+T	405
9	Change of motor + pinion at TR-7A left side	23.30-3.20	Tm	230
10	Change of turbine and motor at TR-7	8.20-11.20	Tc	180
11	Left side broken gear box/ broken bearing afferent to the third step	16.45-2.30	Tr	585
12	Change of gear box TR-7A	6-24	Tr	1080
13	Broken chain of the cutter loader towards the station	23-11	Cb	720
14	Crumbling C41-C47. Blocked TR-7A	14.20-2.30	S+T	730
15	Change of pinion TR 7A	7.30-8.35	Tr	65
16	Change of the cutter loader motor towards the station	17-3.40	Cm	640
17	Broken chain TR 7A	17.30-19	Te	90
18	TR 7A blocked. Crumbling C84-C93	19.45-12.30	S+T	165
19	Change of plate yoke at TR 7	19.30-21.15	Tj	105
20	Change of hydraulic motor of the cutter loader	19-6.30	Cm	390
21	Change of the central pump of the cutter loader	10.30-16.35	Cp	365
22	Sheared pipe of central pump	4.30-5.10	Cp	40
23	Broken reduction la TR 7	6.10-10.20	Tr	250
24	Broken chain TR 7, below	22.30-…	Te	-
25	Blocked roll of chain guiding	8.30-18	Te	570
26	Blocked TR 7A. Crumbling	18.30-10.30	S+T	960
27	External causes (TR 7)	-	-	-
28	Blocked TR 7A and crumbling C69-C70	3-4.45	S+T	105
29	External causes	-	-	-
30	Causes external to the stope	-	-	-
31	Causes external to the stope	-	-	-
32	Causes external to the stope	-	-	-
33	Burnt motor of the cutter loader towards the station	21-4.30	Cm	310
34	Work schedule	6-19	-	900
35	Broken chain TR 7 both branches	11.40-13	Te	140
36	Broken chain TR 7A, below	3-6.20	Te	200
37	Change of TR 7A	3-21.45	Tr	1125
38	Broken chain TR 7A	19.20-20.35	Te	105
39	Causes external to the stope	-	-	-
40	Broken chain TR 7A, pallets fallen below	4.30-6.15	Te	105
41	Work schedule	6-18	-	12 ore
42	External causes	-	-	-
43	Broken chain TR 7A	18.45-20	Te	75
44	Change of cutter loader motor	13-22	Cm	540
45	Change of cutter loader chain towards the station	6-10.30	Cb	270
46	Chain broken below at TR 7A	7-10.20	Te	200

Systematizing the data

Cause of interruption	Broken elements	Frequency of failure	Share (%)
Interruptions caused by cutter loader C	Sleigh	1	2.6
	Hydraulic pump	2	5.2
	Motor	5	13.3
	Arm	2	5.2
	Total cutter loader	10	26.3
Interruptions caused by transporters T	Broken chain	9	23.6
	Motor	2	5.2
	Reducer	7	18.4
	Coupling	2	5.2
	Gutters	1	2.6
	Total transportation	21	55.2
Interruptions caused by crumbling, S+T	Total S +T	7	18.4
Total long interruptions determined by the stope's inner causes		38	100

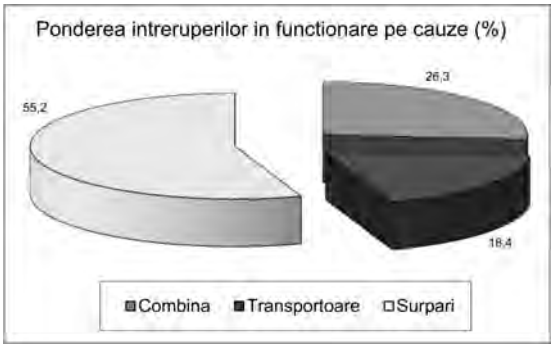


Fig. 2. Share of functioning interruptions in accordance to their causes
Cutter loader/ Transporters/ Crumbling

A closer analysis of the long interruptions having occurred during January was further undergone while considering the position of the workers within the stope, the production obtained, the advancement made and, especially the location of the work front when long functioning interruptions of the stope occurred.

The collected data are systematized in the following table:

Day	**Advancement**	**Production**	**Jobs**				**Efficiency**
	Per day (m)	Per day (t)	Shift I	Shift II	Shift III	Shift IV	Per day (t/job)
1	0.6	800	17	18	15	16	12.12
2	0.4	520	17	17	13	14	8.52
3	0.7	927	18	17	14	16	14.26
4	0.7	943	19	18	15	15	14.07
5	0.6	926	20	19	18	17	12.51
6	0.6	833	17	17	17	15	12.62
7	0.8	1050	18	16	13	15	16.93
8	0.7	945	18	17	20	16	13.30
9	0.8	1116	17	16	16	15	17.43
10	1.0	1228	17	18	18	16	17.97
11	0.8	1037	20	16	16	14	15.71
12	1.0	1295	19	16	13	14	20.88

13	0.8	1196	19	16	15	15	18.40
14	1.0	1090	19	17	17	16	15.79
15	0.9	1031	18	15	16	16	15.86
16	0.9	1198	16	15	14	15	19.96
17	0.8	1206	19	17	16	16	17.73
18	1.0	940	18	17	17	14	14.46
19	0.9	1092	18	17	16	16	16.29
20	0.7	770	17	18	16	15	11.66
21	0.6	756	17	15	14	15	12.39
21	0.2	239	18	15	16	13	3.85
22	0.4	555	18	15	16	15	8.67
23	0.8	957	19	17	18	15	13.67
24	0.5	605	19	17	17	16	8.76
25	0.8	934	19	16	16	14	14.36
26	0.6	706	17	16	14	14	11.57
27	0.8	945	17	17	16	16	14.31
28	0.8	980	17	17	16	16	14.84
29	0.4	560	16	17	16	14	8.88

Conclusions

In accordance with the facts noticed within stopes, it appears that cutter loaders might be approached as causes determining certain labour consumptions.

The labour consumption generated by the cutter loaders might be generated both during the functioning periods of the stopes and during other periods, including revisions, repairs, transportation, etc. In the case of the labour consumptions determined during the functioning period of the stope, the labour consumptions resulting when work is interrupted should be mainly insisted upon.

During the short-term interruptions (less than ten minutes), determined by various reasons, there is a labour consumption in connection with surveillance as well as a labour consumption that regards the chains of connected operations.

Depending on the mine timbering form, there are:

- Roof and front conditions that require surveillance (non-admitted advance);
- Frontal type over - spacing (spacing for a maximal production).

Depending on the form of organizing, additional labour consumptions may come out in the case when the interruptions of the cutter loader for support and front securing should be operated. In accordance with the above mentioned data and depending on the programme of short term interruptions, a series of measures may be adopted, such as: the increase of the surveillance of the formation and of the advancing speed of the cutter loader.

With a view to decreasing labour consumption, two solutions appear to be most appropriate:

1. The regulation of labour rate through employing small amounts of labour;
2. The reorganizing of the workers in accordance with the operational groups, while observing Goizman organizing model.

The analysis of the data having resulted from photo-timing determines the following observations:

- The most frequent reason for the interruptions of the mechanized stope is the transportation flux, displaying a share of 27 % during one shift; meanwhile, the interruptions determined by the cutter loader represent only 8 %;
- Although the cutter loaders belonging to the active face are able to cut in shuttle, nonetheless, mine-directional cutting has been more widely used, owing to the fact that, as the stope inclining represents more than 8 %, the first elements that would break include the hydraulic pump and the hydraulic motor; as a consequence, cutting

is performed from the upper part towards the lower part, while the operation of mechanical cleaning is performed along the opposite direction;

- In the case of the stope exhibiting an increased length, the entering of the cutter loader into the strip is operated along narrow bands and not from the niche, owing to the fact that the cutting of the niche performed by the cutter loader requires a large consumption of labour as well as the workers possession of real skills. Another reason that determines such an approach is that the upper entries and lower galleries are not always parallel, due to the non-uniform character of the stratum; as a consequence, it is required to advance with one of the terminals with a view to be able to circumscribe within a certain curving area;

- The daily average production is lower than the planned average by 14 %, approximately;

- The daily average advancing speed is higher than 1 meter per day, so that it is 11. 22 % lower as compared with the minimum two cycles amount required;

- The efficiency obtained represents 16 - 19 t/ shift - worker; nonetheless, this amount might drop to 9 t/ shift - worker;

- The workers arranging within the stope is, generally, as planned.

References

Goizman, E. I.
1977
Modelirovanie proizvodstvennâh proțesov na șahtah, Nedra, Moska
Sloan, D. A.
1983
Mine Management, Chapman and Hall, New York
Simionescu, A., Dijmarescu, I.
1985
Organizarea si conducerea activitatilor miniere, Editura tehnica, Bucuresti
Tiuzbaian, I. N.
2002
Cercetări în vederea elaborării unui nou sistem de normare a muncii la minele din Valea Jiului având la bază ingineria metodelor de muncă, Doctoral thesis, Petroșani
Tiuzbaian, I. N.
2003
Studiul si normarea muncii, Universitas Publishing House, Petrosani
Tiuzbaian, I. N.
2016
Activities improvement at an opening mining work employing the technique of labour methods engineering, RMEE International Management Conference: From Management of Crisis to Management in a Time of Crisis, Cluj-Napoca, 2016.

ULAM-HYERS STABILITY OF FREDHOLM-VOLTERRA INTEGRAL EQUATION FROM ECONOMIC THEORY

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Abstract

Purpose *– In the economic theory many problems lead to mathematic models and in particular to differential and integral equations.*

Methodology/approach *– Some new models from economic theory lead to Fredholm-Volterra integral equation (Ciplea & Lungu, 2012). In this case we study the stability of these models.*

Findings *– The goal of this paper is to give a Ulam-Hyers-Rassias stability result, for a Fredholm-Volterra integral equation from economic theory.*

Research limitations/implications *– Many external factors influence the price, the price fluctuation and the price of a derivative financial product. The researched problem is the stability of these equations.*

Practical implications *– In generally, we say that a integral equation is Ulam stable if for every approximate solution of the integral equation, there exists an exact solution near it. This method can be a good instrument for an performance management in economic theory of price fluctuation.*

Originality/value *– We use the theory of Ulam-Hyers-Rassias stability. The goal of this paper is to give a stability result for a Fredholm-Volterra integral equation from economic theory (price fluctuation).*

Key words: *Economic theory, Ulam stability, Fredholm-Volterra integral equation, price, price fluctuation.*

1. Introduction

In the economic theory, many models lead to differential equations, partial differential equations (Ciplea & Lungu, 2016; Farahani & Grove, 1992; Lungu & Ciplea, 2010a; Lungu & Ciplea, 2010b; Lungu & Ciplea, 2016), Fredholm-Volterra integral equations (Lungu, 2007; Lungu, 2011; Lungu & Rus, 2009; Mureşan, 2008; Mureşan & Iancu, 2002), functional-differential equations (Cădariu & Radu, 2007; Lungu & Rus, 2009; Mureşan, 1993; Popa, 2005; Rus & Lungu, 2008). In this paper we study some new models from economic theory which lead to Fredholm-Volterra integral equations. The aim of this paper is to give some Ulam-Hyers stability results for Fredholm-Volterra integral equations which appear in economic theory.

This problem has been studied in (Ciplea & Lungu, 2012; Lungu & Rus, 2009; Mureşan, 1993; Popa, 2005; Popa & Raşa, 2011; Rus & Lungu, 2008; Rus, 2009a; Rus, 2009b). Here we will present two types of Ulam stability for Fredholm-Volterra: Ulam-Hyers stability and generalized Ulam-Hyers-Rassias stability.

In 1940 (Ciplea & Lungu, 2016), on a talk given at Wisconsin University, S.M., Ulam formulated the following problem: "Under what conditions does there exist near every approximately homomorphism of a given metric group an homomorphism of the group?" (Ciplea & Lungu, 2016, Popa, 2005).

Generally, we say that an integral equation is stable in Ulam sense if for every approximate solution of the integral equation, there exists an exact solution near it.

The goal of this paper is to give a stability result for a Fredholm-Volterra integral equation of the form:

$$u(x,y)=h(x,y)+\int_0^x\int_0^b f(x,y,s,t,u(s,t))dsdt\,. \tag{1.1}$$

We will present two types of Ulam stability for Fredholm-Volterra integral equation: Ulam-Hyers stability and generalized Ulam-Hyers-Rassias stability.

Here we need the following results (Lungu, 2007; Lungu, 2011; Rus, 2009a; Rus, 2009b; Rus, 2003):

Lemma 1.1. Let $h\in C([a,b]\times[c,d]),\mathbf{R}_+)$ and $\beta>0$ with $\beta(b-a)(d-c)<1$. If $u\in C([a,b]\times[c,d],\mathbf{R}_+)$ satisfies

$$u(x,y)\le h(x,y)+\beta\int_a^b\int_c^d u(s,t)dsdt,\ \forall x\in[a,b],\ y\in[c,d] \tag{1.2}$$

then

$$u(x,y)\le h(x,y)+\frac{\beta}{1-\beta(b-a)(d-c)}\int_a^b\int_c^d h(s,t)dsdt,\ \forall x\in[a,b],\ y\in[c,d]. \tag{1.3}$$

Proof. Here we consider $D=[a,b]\times[c,d]$ and the Banach space $C(D)$ with the norm $||\cdot||_\infty$.

We consider the equation

` $$u(x,y)=h(x,y)+\beta\int_a^b\int_c^d u(s,t)dsdt. \tag{1.4}$$

We denote by $A(u)(x,y)$, the operator

$$A(u)(x,y)=h(x,y)+\beta\int_a^b\int_c^d u(s,t)dsdt \tag{1.5}$$

and

$$|\,A(u)(x,y)-A(v)(x,y)\,|\le\beta(b-a)(d-c)\,||\,u-v\,||_\infty\,.$$

Then the operator A is a Picard operator (Rus, 2003). From the Abstract Gronwall Lemma (AGL), (Rus, 2003), we have

$$u(x,y)\le A(u)(x,y)\Rightarrow u(x,y)\le u_A^*(x,y)\,,$$

where $u_A^*(x,y)$ is the fixed point of the operator A,

$$u_A^*(x,y)=h(x,y)+\beta\int_a^b\int_c^d u(s,t)dsdt. \tag{1.6}$$

If we denote

$$I=\int_a^b\int_c^d u(s,t)dsdt$$

then

$$u_A^*(x,y)=h(x,y)+I$$

and

$$I=\frac{1}{1-\beta(b-a)(d-c)}\int_a^b\int_c^d h(s,t)dsdt$$

then

$$u(x,y) \le h(x,y) + \frac{\beta}{1-\beta(b-a)(d-c)} \int_a^b \int_c^d h(s,t)dsdt .$$

2. Ulam stability of Fredholm-Volterra integral equation

Let $(\mathbf{B}, |\cdot|)$ be a (real or complex) Banach space, $D \subset \mathbf{R}^2$, $D = [0,a) \times [0,b)$, ε a positive real number and $\varphi : D \to \mathbf{R}_+$ be a continuous function. We consider the following Fredholm-Volterra integral equaion

$$u(x,y) = h(x,y) + \int_0^x \int_0^b f(x,y,s,t,u(s,t))dsdt \tag{2.1}$$

$s, x \in [0,a)$, $y,t \in [0,b)$, $f \in C(D^2 \times \mathbf{B}, \mathbf{B})$, $h \in C(D, \mathbf{B})$, and the following inequalities

$$\left| v(x,y) - h(x,y) - \int_0^x \int_0^b f(x,y,s,t,v(s,t))dsdt \right| \le \varepsilon \tag{2.2}$$

$$\left| v(x,y) - h(x,y) - \int_0^x \int_0^b f(x,y,s,t,v(s,t))dsdt \right| \le \varphi(x,y). \tag{2.3}$$

Definition 2.1. (Rus & Lungu, 2008; Rus, 2009a; Rus, 2009b; Rus, 2003). The equation (2.1) is Ulam-Hyers stable if there exists a real number $C_f > 0$ such that for each $\varepsilon > 0$ and for each solution $v \in C(D, \mathbf{B})$ of (2.2) there exists a solution $u \in C(D, \mathbf{B})$ of (2.1) with

$$| v(x,y) - u(x,y) | \le C_f \cdot \varepsilon, \forall x \in [0,a), y \in [0,b). \tag{2.4}$$

Definition 2.2. (Rus & Lungu, 2008; Rus, 2009a; Rus, 2009b; Rus, 2003). The equation (2.1) is generalized Ulam-Hyers-Rassias stable with respect to φ if there exists $C_{f,\varphi} > 0$ such that for each solution $v \in C(D, \mathbf{B})$ of (2.3) there exists a solution $u \in C(D, \mathbf{B})$ of (2.1) with

$$| v(x,y) - u(x,y) | \le C_{f,\varphi} \cdot \varphi(x,y, \forall x \in [0,a), y \in [0,b) . \tag{2.5}$$

Theorem 2.1. We suppose that:

(i) $f \in C(\overline{D}^2 \times \mathbf{B}, \mathbf{B})$, $h \in C(\overline{D}, \mathbf{B})$ and $\varphi \in C(\overline{D}, \mathbf{R}_+)$, $\overline{D} = [0,a] \times [0,b]$;

(ii) there exists $L_f > 0$ such that

$$| f(x,y,s,t,u) - f(x,y,s,t,v) | \le L_f | u - v |$$

for all $x, s \in [0,a]$, $y,t \in [0,b]$ and $y, v \in \mathbf{B}$;

(iii) $L_f \cdot b < 1$, $L_f a \cdot b < 1$;

(iv) $\varphi(x,y)$ is increasing.

Then:

(a) The equation (2.1) has in $C(\overline{D}, \mathbf{B})$ a unique solution $u(x,y)$.

(b) If $v \in C(\overline{D}, \mathbf{B})$ is a solution of the inequality (2.3) for all $x \in [0,a]$, $y \in [0,b]$, then there exists $C_{f,\varphi} > 0$ such that

$$|v(x,y) - u(x,y)| \leq C_{f,\varphi} \cdot \varphi(x,y), \forall x \in [0,a), y \in [0,b),$$

hence, the equation (2.1) is generalized Ulam-Hyers-Rassias stable.

Proof. (a) It is a known result, consequence of the Banach fixed point theorem.

(b) From (2.1) we have:

$$|v(x,y) - u(x,y)| \leq \left| v(x,y) - h(x,y) - \int_0^x \int_0^b f(x,y,s,t,u(s,t))dsdt \right|$$
$$+ \left| \int_0^x \int_0^b [f(x,y,s,t,v(s,t)) - f(x,y,s,t,u(s,t))]dsdt \right|,$$

and from (2.3) it follows

$$|v(x,y) - u(x,y)| \leq \varphi(x,y) + \int_0^x \int_0^b |f(x,y,s,t,v(s,t)) - f(x,y,s,t,u(s,t))| \, dsdt$$

hence

$$|v(x,y) - u(x,y)| \leq \varphi(x,y) + L_f \int_0^x \int_0^b |v(s,t) - u(s,t)| \, dsdt .$$

From Lemma 1.1 we have that

$$|v(x,y) - u(x,y)| \leq \varphi(x,y) + \frac{L_f}{1 - L_f a \cdot b} \int_0^a \int_0^b \varphi(s,t)dsdt .$$

But there exists m_φ and M_φ such that

$$0 \leq m_\varphi \leq \varphi(x,y) \leq M_\varphi, \forall x \in [0,a], y \in [0,b]$$

and we have

$$|v(x,y) - u(x,y)| \leq \left[1 + \frac{L_f a \cdot b}{m_\varphi (1 - L_f a \cdot b)} \right] \varphi(x,y)$$

then

$$|v(x,y) - u(x,y)| \leq C_{f,\varphi} \cdot \varphi(x,y)$$

where

$$C_{f,\varphi} = 1 + \frac{L_f a \cdot b}{m_\varphi (1 - L_f a \cdot b)},$$

and the equation (2.1) is generalized Ulam-Hyers-Rassias stable.

References

Cădariu, L., and Radu, V.
2007
"The fixed points for the stability of some functional equations", Carpathian J. Math., no. 1-2, 63-72.
Ciplea, S. A., and Lungu, N.
2012
"A functional-integral model for price fluctuation in a single commodity market", Review of Management and Economic Engineering, Vol. 11, no. 4(46), 149-156.
Ciplea, S. A., and Lungu, N.
2016
"Ulam-Hyers stability of Black-Scholes equation", Stud. Univ. Babeş-Bolyai Math. Vol. 61, no. 4, 467-472.
Farahani, A. M., and Grove, E.A.
1992
"A simple model for price fluctuation in a single commodity market", Contemporary Math., 129, 97-103.

Lungu, N., and Ciplea, S. A.
2010a
"Mathematical models in the economic dynamics", Review of Management and Economic Engineering, Vol. 9, no. 4, 149-159.
Lungu, N., and Ciplea, S. A.
2010b
"Ulam stability of some integral equations from economic dynamics", ACAM, Vol. 19, no. 2, 289-295.
Lungu, N., and Ciplea, S. A.
2016
"A new model for price fluctuation in a single commodity market using mathematical theory", Proceedings of the 5th Review of Management and Economic Engineering. International Management Conference, “From Management of Crisis to Management in a Time of Crisis”, 172-180.
Lungu, N.
2007
"On some Volterra integral inequalities", Fixed Point Theory, Vol. 8, no. 1, 39-45.
Lungu, N.
2011
"Ulam stability of some Volterra integral equations", Fixed Point Theory, Vol. 12, no. 1, 127-136.
Lungu, N., and Rus, I. A.
2009
"On a functional Volterra-Fredholm integral equation, via Picard operators", Journ. Math. Inequal., Vol. 3, no. 4, 519-527.
Lungu, N., and Rus, I. A.
2012
"Gronwall inequality via Picard operators", Sci. Annals of Al. I. Cuza Iaşi, TLVIII, f. 2, 269-278.
Mureşan, A. S.
1993
"On some models of price fluctuations in a market economy", Stud. Univ. Babeş-Bolyai Math., no. 2, 15-20.
Mureşan, A. S.
2008
"Step method for a functional-differential equation from mathematical economics", Carpathian J. Math., Vol. 24, no. 3, 356-362.
Mureşan, A. S., and Iancu, C.
2002
"A new model of price fluctuation for a single commodity market", Fixed Point Theory, Vol. 3, 277-280.
Popa, D.
2005
"Hyers-Ulam-Rassias stability of a linear recurrence", J. Math. Anal. and Appl., Vol. 309, 591-597.
Popa, D., and Raşa, I.
2011
"On Hyers-Ulam stability of the linear differential equation", J. Math. Anal. Appl., Vol. 381, 530-537.
Rus, I. A.
2003
"Picard operators and applications", Scientia Math. Japonica, Vol. 58, no. 1, 191-219.
Rus, I. A.
2009a
"Ulam stability of ordinary differential equations", Stud. Univ. Babeş-Bolyai Math., Vol. 54, no. 4, 125-133.
Rus, I. A.
2009b
"Remarks on Ulam stability of the operatorial equations", Fixed Point Theory, Vol. 10, no. 2, 305-320.
Rus, I. A., and Lungu, N.
2008
"Ulam stability of a nonlinear hyperbolic partial differential equation", Carpathian J. Math., Vol. 24, no. 3, 403-408.

IMPROVING PRODUCTS AND SERVICES USING ONLINE COMMUNICATION TOOLS AND SOCIAL MEDIA

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Abstract

Purpose - *Companies are challenging nowadays a competitive environment and developing relationships with clients can be difficult, as many of them have different internal structures and strategies.*

Methodology - *Thus, this work is describing the steps that should be adopted in order to implement a conceptual model of a platform that is efficient in managing both internal and external communication, with digital marketing features, conducting to the improvement of products and services.*

Findings - *The research conducted revealed that companies today are giving a great importance to developing and implementing communication strategies inside the company and in the online environment for a better adaptation of their products/services with client's personalities and preferences.*

Research limitations/implications – *The model is a conceptual one, based on bibliographic research regarding the current state of the companies and their needs, which is why for reasons of implementation and use, requirements that have not been addressed can arise.*

Practical implications – *Without proper training in explaining the platform and the functionalities it provides to people who have access to it, it can lead to its non-use or inefficient use.*

Originality/value - *The authors in this paper propose an internal organizational model of connection with external clients based on a secure account which will allow the users to generate statistics, use custom templates depending on their actions and have access to the main data in order to perform their tasks.*

Key words: *online communication platform, social networks, company relationships*

Introduction

According to Businessdictionary.com, the term of communication stands for "two-way process of reaching mutual understanding, in which participants not only exchange (encode-decode) information, news, ideas and feelings but also create and share meaning. In general, communication is a mean of connecting people or places. In business, it is a key function of management – an organization cannot operate without communication between levels, departments and employees", thus is essential for any organization to perform communication in an effective manner.
[http://www.businessdictionary.com/definition/communication.html]

Business Communication is directed by specific principles and standards goal-oriented; all principles, directions and policies of an organization must be conveyed to individuals inside and outside the organizational environment. Today business communication helps on framing the goodwill of an organization, by two types of connection between people or places: oral communication (formal - like interviews, meetings, speeches, or informal – which often crosses boundaries within an organization) and written communication (manuals, reports, schedule).

Effective Communication is an essential element of management key functions of planning, organizing, coordination and controlling, helping managers to perform their responsibilities; all the important

information must be conveyed to managers, who need to transform it in plans for their subordinates to implement, also team leaders must perform effective communication with employees in order to achieve the goals.

Summarizing the importance of business communication, we underline the motivation of employees, by transmitting specific information about tasks, by organizing meetings, other oral and written channels. Keeping a well-informed employee and building a general positive attitude, as well as having well informed managers will give the chance to change the course of action for improving organizational performance. Also, it is helping managers in the decision-making process and the developing and maintaining an effective communication system in the company.

Context

1. Efficiency of Online Communication Tools Within the Company

The business communication trends in today's companies are pursuing the existence of a document-flow using online tools like E-mail, Intranet, VPN (Virtual Private Network) to improve the services/products provided internally, respectively the deliverables of company's activity.

Every team, either is the company's team or a project team, needs a communication plan reliable in a timely manner. This plan must start from understanding two main categories of communication.

- Synchronous communications (all the parties of the communication are involved at the same time). Examples: conference call, video-conference, computer assisted conference, meetings, texting.
- Asynchronous communications (the parties can be spread across time zones; they are not present at the same time.) Examples: E-mail, package delivery, fax, project blog, RSS – Really Simple Syndication (a technology facilitating the subscription access at online news sources, for projects directly affected by different external factors).

Companies need to build good communication strategies as part of the culture, including project communication plans, defining the type of information to be delivered, who will receive it, in which format it will be delivered, the periodicity of its distribution. Managers spend around 90% of their time on communication, ensuring the distribution of the right messages at the appropriate time and the pursue of the targets established.

Therefore, it is mandatory for managers, as well as for company's entire activity to elaborate a communication requirements analysis. This will help to establish the kind of communication stakeholders need to make appropriate decisions and the timing and methods of communication necessary for avoiding redundancy.

2. Efficiency of Online Communication Tools with Clients

In a world where social media and new technologies increasingly influence business decision-making, the development of integrated campaigns to promote products and services in the online environment is the main trend in Internet-based business communication in 2017, through tools which are dedicated to categories well defined by customers.

Social media promotion means have become more and more an integral part of the marketing plan set up by each business owner on the web. Everything is due to the emergence and spread of social networking that allowed the development of a new branch of online marketing, Social Media Marketing.

Users spend a huge amount of their time on social networking, in consequence the presentation of their own business on these social networks has become a necessity. Moreover, the absence of Twitter followers or friends on Facebook is interpreted as a loophole that could curb the growth of a business.

Always available via tablets, laptops, smartphones, etc., social networks can be accessed from anywhere, anytime.

Online communication tools develop relationships much closer to consumers than other channels and offer interaction with them. Traditional advertising can be viewed as a monologue in the relationship with consumers, while the online one, for example, offers the opportunity of a new communication model - the dialogue. Thus, the brand-client relationship becomes stronger and more durable in the light of the direct link that is created.

In terms of online communication, most of the companies have been assigned a person inside the company to deal with it or a number of employees, depending on the size of the company. However, there are situations where it is intended to outsource such communication to a professional and experienced supplier (for example, the Fashion House Outlet Center would like this to be handled by the PR company).

To be as close as possible to potential customers, companies do not just use a communication channel, but a mix of more ways to interact with customers, for reaching as many customers as possible. In the case of the communication channels mentioned above, problems arise when the approach of the clients is mechanical and short-term. Thus, the first rule is to make the company interesting and after taking the first step to wait for feedback and then continue to act.

Keeping a high standard of online communication tools will have a positive impact in organizational and online communication with the clients or business partners.

Methodology

In project management, it is crucial to determine the stakeholder's needs as early as possible in the planning phase of the project management life cycle. The type of information communicated usually will include project status and updates, risk assessment, action plans, performance measures, evaluation, project acceptance, support for the customers, etc. The communication plan should document the methods of communicating, such as conversations, email, written reports, meetings, online databases, project websites, besides the timing of communicating.

Businesses nowadays have their own internal communication system and structures, regardless of the size of the company. Company's communication plan should follow organization's chart and document the methods of communicating, allowing managers to transmit information to subordinates and employees and to give feedback to managers. This will enable quick adjustments of the plans, information flowing downward from the top of the company, upward from the lower levels, horizontally among colleagues or diagonally among departments. In the figure 1 is presented a basic project chart, which can serve as a template for a new project chart.

In project management, creating a communication plan means to follow a few important steps, as presented below.

1. Identifying and defining the communication relations and responsibilities, according to the project chart.

Figure 1: Project Chart

2. Defining the communication plan and the format used during the project phases (written, online, electronic, standardized formats, including ISO formats).
3. Define the periodicity of the communication processes and deliverables.

Communication Plan Template				
Project name:		Beginning Date:		
Project Manager:		Completion Date:		
Plan Owner:				
Planning				
Project objective and key message points (high level): - -				
Stakeholders - target audience (list): - -				
Outline				
Timeline (Date)	Team member (responsible for the communication)	Target (audience)	Tool (medium for communication delivery)	Message Points

Figure 2: Project Communication Plan Template

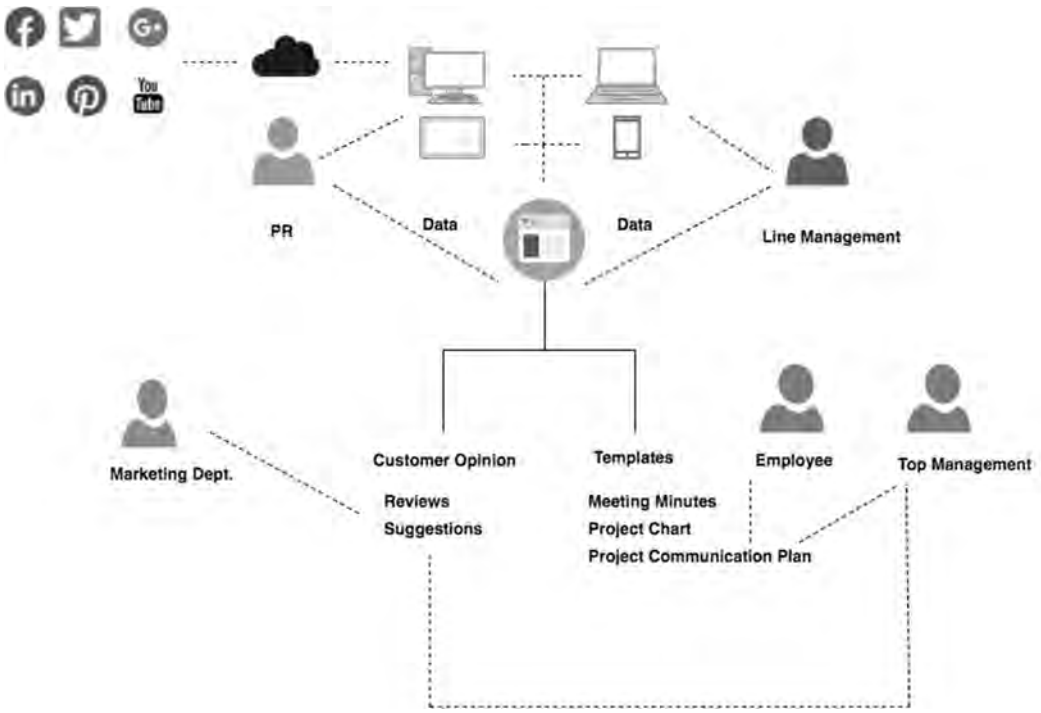

Figure 3: Use Case of the Platform

The platform can be accessed by any user who has a device with a valid Internet connection. People can benefit from it in any other environment, inclusive from outside the company.

Each user has restricted access depending on the position they hold within the company. The existing account restrictions and issues regarding the platform are managed by the application administrators. Any owner of an account, once logged with the credentials send via email by the company, may modify their security data by pressing the user icon.

Figure 4: Main Page of the platform

A user may have the right to edit or view the data as follows:

- The PR company extracts data from social media channels and imports them into the consumer data section. They do not have access to the templates section.
- Line management can add new templates and access existing ones.
- Top management can only edit/download templates and view consumer data.
- Employees only have access to templates.

If a user is restricted from one of the two sections, the one in question will redirect him to a page where he will receive the following message: "Access denied. Please contact the administrator. "

Based on data taken from social networks and introduced by the PR in the application, analyses can be made in the form of graphs. These can be done over a period selected by the people in the marketing or top management department who have access. The period is selected in the two boxes, which is the starting and the end date. They do not fill in manually, but calendars will appear when you press them. Based on the results there can be made decisions and adopt new strategies or improve the existing ones.

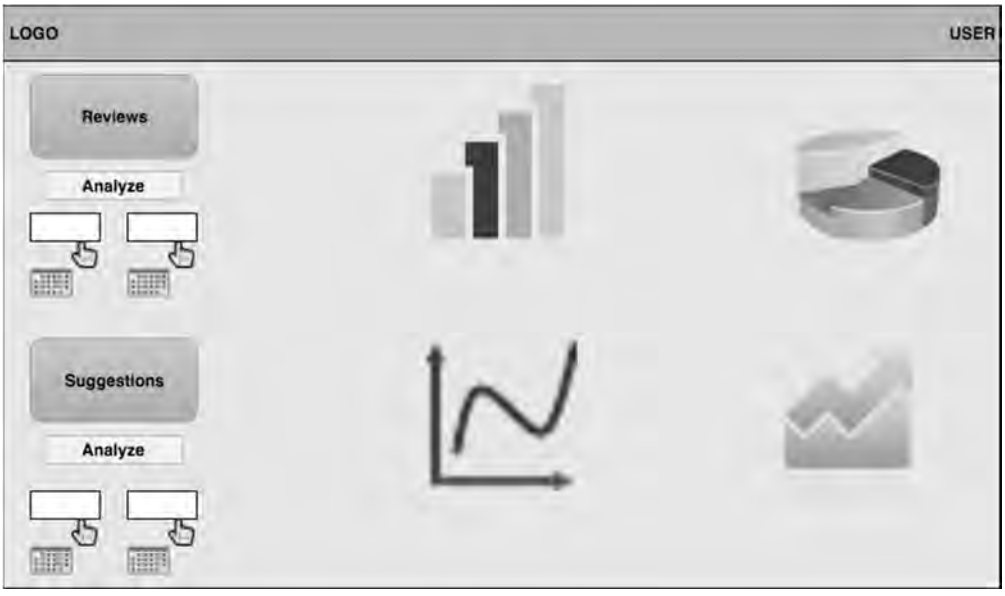

Figure 5: Consumer Data Dashboard

From the templates section, there can be accessed those introduced by line management to streamline the company processes and follow a pattern that reduces the time it takes to create a new one from 0, and the ability to be stored in the digital environment, making it much easier to find and work with data. Thus, the data is online, organized, easy to find, quick to complete as the template is already done.

Once the line management wants to update an existing template, the old one will be automatically removed when the Upload button has been clicked by the user, and the user responds to the question "Do you want to save the new changes?"

A normal user, after clicking on the template button, will be redirected to a page where the existing template options are available. By right click on an option it will appear a drop-down menu where it can be select to create a new one or access those already created by the user logged in:

If the user chooses to create a new x template, he/she will be redirected to a page where the template will appear for editing. There is also an option to download it.

If the user chooses the option to edit the ones already created, he/she will be redirected to a page like google drive, where the information is stored on folders, file types, so that they can be easily accessed and identified.

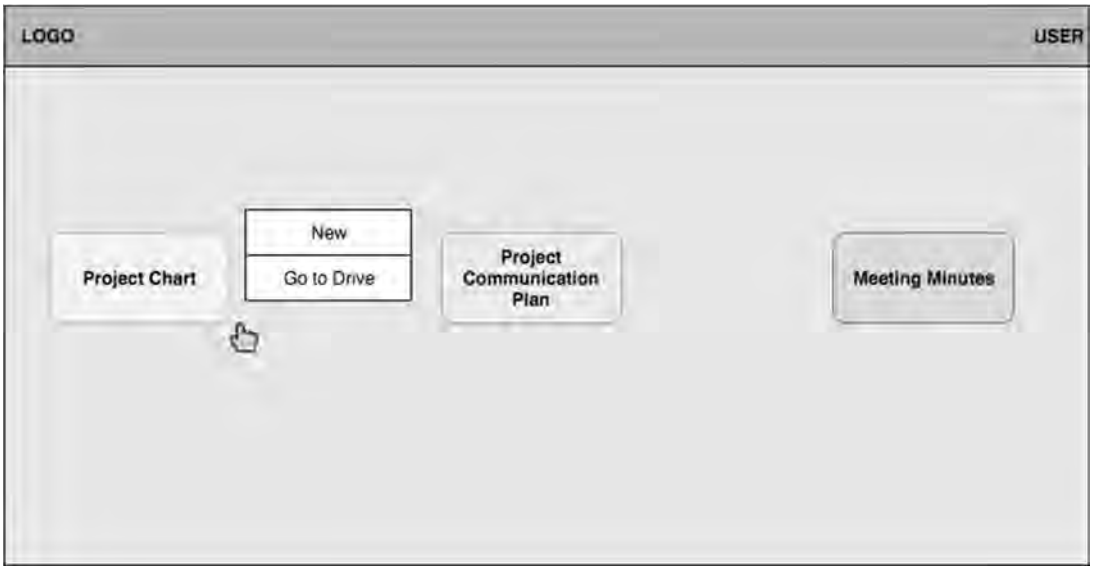

Figure 6: Template Dashboard

The platform's main benefit/purpose is improving company's internal processes along with building a strong relationship with clients by holding them close through a real-time interaction by reviews and suggestions. Another advantage of the platform is attracting new customers and business partners and by consequence increasing the sales.

Besides, this paper aims to draft templates, such as project chart template (Figure 1), communication plan template (Figure 2) and meeting minutes, (Figure 7) useful for the regular meeting and for the scrum meetings inside the company.

Company's logo	**Meeting Minutes**	**Date:**	
		Time:	
		Location:	
		Next meeting's date:	
Minutes initiator:			
Minutes drafted by:			
Team name:			
Meeting attendees present:			
-			
-			
Agenda			
-			
-			
Materials discussed			
-			
-			
Actions			
Action	**Responsible**	**Deadline**	
-	-	-	
-	-	-	
The minutes will be electronically dissaminated and approved			

Figure 7: Meeting Minutes Template

Results

The authors conducted a research based on a theory-building approach in order to obtain a framework that wants to cover four of the social media marketing dimensions as follows: scope, culture, structures and governance. By using their framework and the ideas exposed on their paper, they add a plus on improving the company's targets. [Felix, 2017]

The researchers present a framework that examines the generated content by the user on social media sites like: quantitative, text mining, sentiment analysis to compare the social media information gathered from competitors. This fact is important for us to take into consideration when the strategies of the companies are developed. [http://www.tandfonline.com/doi/abs/10.1080/08874417.2016.1117377]

Social media is also a channel used to provide customer support at the present moment and meaning to that paper because of customer's satisfaction importance in the life of a product or the company itself. The researchers tested their theory on Twitter messages from the beginning of the conversation and it is based on the affective part of the humans and their personality the prediction about their level of satisfaction. [Herzig, 2016]

Their study reveals the significance of customer in each company for adopting the proper business strategy and to develop strong relations with them which will increase the profitability of the firm in a long term. The strategies play a crucial role because they guide the activity and the adaptability of the firm in different situations that may occur. [Carmen, 2016]

Discussions and conclusions

The most important thing is to gain the trust of internal clients and consumers and to be able to keep in touch with them always, to provide them with the information they need about the products the company offers or about the projects and activities that she is involved in. Companies sell products or services, and consumers share their experience with others on different sites, thus constant communication is essential, and the dialogue must contain a direct, personalized address. Neglecting the consumers on the other hand will bring negative consequences for the brand and sales because this is a way of giving the advantage of the dialog to the competition.

Another important aspect that should be taken into consideration is that the efficiency of the processes within a company and their automation is desirable in order to give employees time to solve urgent problems and to inform them about client's opinion on what they are offering on the market.

One benefit of using the platform proposed in this article is given by the data that is stored in the Cloud, avoiding its loss, as well as facilitating its location, time to access and use it, when we speak about the internal organization of the company. Through the templates added by the line management, the process of completing them will take a much shorter time as the employee should not make one from scratch. Also, the fact that he has guidelines about what he must follow helps him concentrate on the important problems and tasks that imply logic.

The platform's main benefit and purpose is improving company's communication processes along with building a strong relationship with internal and external clients by holding them close through a real time interaction by analyzing reviews and suggestions and fulfilling their needs. Another advantage of the platform is that it creates the premises for attracting new customers and business partners and increasing the sales, by consequence.

References

Businessdictionary.com
2018
http://www.businessdictionary.com/definition/communication.html,
Kennedy Mambwe
2015
The Strategic Role of PR and Corporate Communications, Linkedin.com,
https://www.linkedin.com/pulse/strategic-role-pr-corporate-communications-kennedy-mambwe
Melanie J. Martin
The Role of the Communication Department in an Organization,
http://www.ehow.com/info_8673875_role-communication-department-organization.html
Adrienne Watt
2014
Project Management, https://opentextbc.ca/projectmanagement/chapter/chapter-15-communication-planning-project-management/
Rajkumar, S.
2010
Art of communication in project management, paper presented at PMI® Research Conference: Defining the Future of Project Management, Washington, DC. Newtown Square, PA: Project Management Institute, https://www.pmi.org/learning/library/effective-communication-better-project-management-6480
Elcomcms.com
2016
Communication Tools used in Modern Day Business,
https://www.elcomcms.com/resources/blog/communication-tools-used-in-modern-day-business
Tim Eisenhauer
2017
5 Foolproof Business Communication Tools Every Company Should be Using,
https://axerosolutions.com/blogs/timeisenhauer/pulse/283/5-foolproof-business-communication-tools-every-company-should-be-using
Leadershipchamps.wordpress.com
2008
Communications Requirements Analysis,
https://leadershipchamps.wordpress.com/2008/05/27/communications-requirements-analysis/
Project Management Institute
2013
Communication: The Message is Clear, http://www.pmi.org/-/media/pmi/documents/public/pdf/white-papers/communications.pdf

THE IMPACT OF ORGANIZATIONAL CULTURE ON SAFETY IN MODERN AERONAUTICAL ORGANIZATIONS IN THE CONTEXT OF PERFORMANCE VARIABILITY

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Abstract

Purpose *– The study examines the impact of poor management and bad decisions on safety in aeronautical organizations.*

Methodology/approach *- The means to develop the current research were founded on a wide number of cases analyzed. Literature review, the analysis of regulations/standardised safety measures and the activity of aeronautical organizations represented an important pillar for identifying the strengths and weaknesses of safety/organizational culture.*

Findings *– The culture inside the organization determines the progress and conditions the level of aeronautical safety. The differences between similar organizations which operate in different cultures or countries can help understand their operational mindset, procedures and safety performance.*

Research limitations/implications *– Technological progress in aviation does not assure an increase of safety and efficiency, it mainly offers different perspectives regarding the nature of operations. If the same technology is used by two different organizations the results registered could be totally different.*

Practical implications *– The considerations regarding organizational culture deem various inter-organizational factors which influence substantially the effectiveness of operations and the development of the organization.*

Originality/value *– Aeronautical systems' development must have as a starting point the organization. The research emphasize the connection between safety culture, the commitment of management structures, safety performance and strategic risk management.*

Key words: *organizational culture, management performance, safety.*

Introduction

Organizational culture is one of the most debated subjects in aviation. The complexity of systems has imposed the need of developement and adaptation in the operational environment. Safety management system offers a guidance based on thorough evaluation and analysis of lessons learned, but it does not eliminate risk. However, with the right model, culture and practices, risk can be controlled in every situation, thus increasing the level of safety and efficiency.

In the modern era of aviation safety has become the fundamental element of aeronautical operations; every aspect during ground operations, ATM, flight and onboard crew duties or airport procedures are based primarily on safety elements. The high level of technology, the growing number of complex aeronautical organizations worlwide has imposed the need to prioritized and standardised safety measures; as a result, in the past years the necessity to improve safeness has led to the development of ICAO Annex 19 – Safety Management. In aviation it is impossible to eliminate risk; it will always be something characteristic to aeronautical operations, but with the proper methods and applying the right control measures it can be maintained at a very low/acceptable level.

In recent years, aviation has become one of the safest transportation systems; technology has relieved human operator of many duties and worldwide standardization increased the level of safety.

Considerations regarding organizational culture

The organizational culture of aeronautical systems is a very complex phenomenon, with multiple possibilities to define according to specialized literature. A good culture could have considerable effects, positive or negative; can represent a powerful advantage or can destroy the organization.

The discussion about culture begins with the national culture – those attributes that differentiate the natives of a culture from the others who belong to other cultures. Aircrews – pilot, flight navigator, flight engineer, loadmaster, flight attendant and other airborne operators – actions, attitudes and aptitudes are being influenced by three cultures, according to specialized literature. The first, is the national culture, but also, a professional culture exists with strong effects, which is associated with pilot profession.

There is a connection between safety culture, the commitment of management structures, safety performance and strategic risk management. The success of a safety program implies top management to demonstrate not only a simple interest for a certain situation, but also a long-term commitment for enhancing safety. Each management action must demonstrate in a certain measure leadership and must send a clear message regarding the commitment for safety and efficiency. This aspect will underline the relative importance of management structure perceptions, attitudes and behavior within the safety climate, related with other functions like the followings: selection, planning, discipline, execution, instruction etc. (Van Dyke, 2006).

The commitment of management structures to establish, maintain and develop a strong safety culture will have as result an increase of financial and operational efficiency and of benefits in strategic planning, giving the possibility for the organization to control and exploit new opportunities with higher efficiency (Van Dyke, 2006).

Compatibilities in modern aeronautical organizations

Management structure means the mass of the decision makers, well-defined hierarchical, who dictates and influence the organizations perspectives, policies with direct impact on safety and efficiency during systems operations. Risk is and will always be present in aviation, regardless of technological development and organizational experience, but with the right model, culture and practices, risk can be controlled in every situation.

Fig. 1 Compatibilities in aeronautical organization

The first step in obtaining compatibility between the three main elements presented above is to create a unique organizational model. This implies an adequate management system with proper beliefs, theories, principles and thorough understanding of all elements and how they influence the organization in a certain moment, with the purpose to have a system that can function properly in any given situation.

The second step is to develop a strong organizational culture. A very important aspect in this manner is to have adequate values that would represent the foundation of organizations nature. A value represents the central belief within organization which assures an internal strong consistency on thinking, emotions, attitude and behavior. When an organization articulates the position of values (through visions and goals), its character is determined. The decisional process is defined by the management structures and reflected by the behavior of people within that organization, but also through performance and progress in the operational environment (Padaki, 2003).

The third step of achieving compatibility is to define the organizational practices and use them during operations. The desire of performance and progress in respect to safety reflects the management systems methods, tools and techniques. Another aspect in this manner is the way people relate to each other according with the status and experience they have within the organization.

Question of incompatibility can occur at two or more management systems who exercise requirements over people without regard for the conflict between existing values.

Understanding organizational culture and its impact on future operations. Analysis of AC-130J test flight accident, April 2015

Every organization has its own specific. The differences between similar organizations which operate in different cultures/countries can help us understand their operational mindset, procedures and safety performance. Technological progress in aviation does not assure an increase of safety and efficiency, it mainly offers new possibilities and perspectives regarding the nature of operations. One of the most important aspect when in comes to safety and efficiency is the organization with all the particularities that defines it. If the same technology is used by two different organizations, the results registered could be totally different; mentality, attitudes, aptitudes, the complexity of missions assumed are among the defining elements of an organization.

In april 2015, AC-130J aircraft was flight tested by 413th Flight Test Squadron at Eglin Air Force Base in Florida, USA. The purpose of the flight was to obtain information regarding flight envelope.

The flight was performed at 15000ft and the crew received specific indications regarding the maneuvers which they must execute, the main objective being pushing the airplane to its limits. As a result, the pilot performed a sideslip maneuver by lowering one wing and applying opposite rudder; this action is often used during landings with strong crosswind. The aircraft stalled, momentarilly inverted, losing 5000ft until the pilots managed to bring the aircraft in stabilized flight. The pilot and copilot landed the aircraft safely and nobody was injured. But the high g-forces (over 3g-force) have affected the structure of resistance, the aircraft being declared inoperative. According to US Air Force, this damage was estimated at $115.6 million dollars (Swarts, 2016).

The cause of this event, according to the investigators, was the fact that the pilot ”excessive rudder input during test point, followed by inadequate rudder input to initiate a timely recovery from high angle sideslip due to over-controlled/under-controlled aircrat”, along with the ”wrong choice of action during an operation” (Rogoway, 2015).

Also, Air Force Accident Investigation Board have concluded that a contributory factor in generating this case was the lack of information on the performance of the aircraft in flight. This information would have helped pilots to understand the limitations of the aircraft when executing the flight tests, but Lockeed Martin did not want to provide this information without an additional contract; in the initially purchase deal made with US Air Force, providing information regarding flight limitations was not a stipulated fact. US Air Force did not agree to these terms and refused to sign another contract. The investigation revealed other factors, like: desorientation, confusion, problems with equipment and

warning systems on board, lack of information and procedural guidance of flight test team (Swarts, 2016).

Following this event, United States Air Force (USAF) decided to purchase the entire set of information regarding the flight performance from the airplane manufacturer, Lockeed Martin. Moreover, a deal was reached with Lockeed Martin to help test units form USAF with planning, execution, analysis and reporting of all the results obtained during flight testing.

Even though a brand new aircraft was lost, a very important one for the operations that USAF carries, it was not considered an unacceptable event because it was a flight test. In the organizational culture of USAF, damaging beyond repaire an aircraft during a flight test in which the limits were tested, even exceeded, represents a totally acceptable event. It is better to have a permanent grounded aircraft in your own territory and a lesson learned, than an aircraft destroyed behind enemy lines (Swarts, 2016).

USAF has an unquestioned tradition when it comes to aviation. They have been permanently developing their system by continuously high financial investments; the progress that have been registered, the continous technological improvement were the result of lessons learned. Aware of the importance of aircraft limits in tactical field, the organization (USAF) considers extremely important technical and practical knowledge, self-knowledge possibilities, implicitly the limits, resulting into a superior level of control, assuring this way a first step in accomplishing the mission – knowing the technological limits you know the limitations of the planning process.

After this event, the aircraft was grounded; the pilot applied overpressure to pull the aircraft from the uncontrollable evolution (over 3g-force) and the structure was damaged, unrecorevable. Even so, this situation was not considered a major event because unwanted situations can happen during a test flight. The organization puts great emphasis on testing and the costs to obtain an efficient and reliable product do not represent a problem. In comparison with different aeronautical military system, and not only, losing an aircraft during a test flight has different importance, sometimes being considered unacceptable. This is why there are organizations in which operational limits of an aircraft are more restrictive and the sanctions are very harsh if the pilots violate the imposed limits – this is a method by which the equipments are protected; the main purpose being a long operational period.

Safety and efficiency are vital for any aeronautical organization; in modern aeronautical systems they cannot be obtained without financial investments. Although this aspect was well known by USAF, they made a mistake from the beginning by overestimating their internal posibilities to gather information. But another lesson learned was needed as a reminder and, finally, they purchased those informations from the manufacturer Lockeed Martin. For ensuring safety and efficiency during future operations with this aircraft, USAF considered necessary to make additional financial investment, in this case they signed a partnership with Lockeed Martin to help the test units from USAF with planning, execution, analysis and reporting of all the results collected from the flight tests in the future – proving a strong commitment for safety, eficiency and performance.

Although USAF is a global renown airpower, it is not flawless. However, it has become a reference and more and more similar systems copy USAF practices hoping that they will obtain the same high operational level, efficiency and safety. Unfortunately, copying from other systems and implementing in your own is a huge error. There is the tendency to take elements from other systems, without a thorough analysis, without an initial evaluation from which it may result the impact that would have on the system to be implemented. Often the elements that prove efficient in the structure of a system are not compatible with others; in this way, the new system is not solid, there is not a strong cultural system, but only chaos within the organization – with no doubt there cannot be progress, the final result will be recklessness. Recklessness is unacceptable given that systems are in a constantly evolving state due to technological development, to organizational principles and theories, to the need to maintain a high level of operational readiness in the context of economical fluctuations, and, with respect to military domain, to geopolitic and geostrategic changes.

A very important action in organizational development is the investment in young people. They must be educated, guided, supported, promoted and encouraged to contribute for the benefit of aeronautical system. Nevertheless, regarding pilots, the experience is vital and, in many cases represents the main element which ensures safety, improving the level of control. Each idea must be considered and evaluated, not criticized. These differences of perception between generations can be very good for the organization. A person with experience may see things in a fairly simplistic manner,

linear, which can be ideal during operations, for example, the desire for change being unexistent. This aspect can be the result of the aptitudinal level achieved and the desire to maintain that level – often there is no willingness to evolve if the person in question considers that the current level is the most suitable for maximum efficiency and safety. Youngster have the tendency to take more risks and the culture within the aeronautical organization must control their attitude; the error margin is very small in aviation, often nonexistent. The visions an ideas that youngster have, can provide benefits to organizational processes only if implemented in a constructive manner. It is important for the organizational culture to facilitate the two-way communication process and, at the same time, to have rigourous features in order to select only those elements that can raise the performance standards.

Predictability is limited during concept phase and operational processes and it is impossible to anticipate or describe how a system should work. Organizations must assure a functionality which includes variability, so that new implemented technologies can work properly.

Performance cannot be described thoroughly, being necessary in a certain extent of variability, flexibility and adaptability for a system to be functional. A system cannot be operational without people. Performance variability and adjustment are normal; these determine both positive and negative results.

Obtaining safety by diminishing performance variability will inevitably affect the process of achieving the desired results, so the productivity is considerably reduced. Understanding the characteristics of performance variability from operational processes and not how something can malfunction is better in terms of safety and efficiency given the continuous development of technologies, procedures and regulations.

Performance adjustment is a continuous process, implicitly performance is variable. Variability should not be considered a negative aspect, contrary to performance deviations, rules violations and lack of conformities; without the ability to adjust the most basic aeronautical operations could not be possible – the ability to adjust represent and essential human contribution.

Each organization has its own particularities; in a great extent these particularities are influenced by the national culture. There is no ideal pattern for culture; an efficient culture in order to achieve a powerful system depends on manner in which are understood, adapted and managed all the particularities and characterisitics it has. Something that it is accepted in a system can be considered, in some cases, totally unacceptable in others. In addition to the elements identified in the above example, cultures have different dimensions that influence managerial approaches.

Discussion and conclusions

Safety and efficiency in modern aeronautical systems are the most important operational features; they represent the basic elements for organizational development and imply achieving a high level of performance. Systems are more and more complex due to technological progress, but at organizational level is necessary to understand all the aspects, especially the interactions between structures. Each detail matters; without excellence in planning it is impossible to obtain efficiency and, without a good risk management, safety is not certainty. Surely, each organization has its own objectives related with the specific of the missions conducted; that is why development must come from within the organization, there must be a logic when it comes to implementing newer elements. Copying other systems, other organizations, does not represent a long term solution and could affect the safety state. Imposing restrictions without regard of the hierarchical levels of control from the organizational structure could have serious repercussions when it comes to maintaining safety state during air operations. Moreover, in present days, a high level of safety state could not be achieved without financial investments.

Lessons learned were the ones that made us realise that the development of aeronautical systems must have as a starting point the organization. The culture inside the organization is the one that determines the progress, influences the mentality and aptitudes, but especially, is the one that conditions the level of aeronautical safety.

References

Eurocontrol
2013
"From Safety-I to Safety-II: A white paper". Handbook. Brussels.
Helmreich, R. L.
1999
"Building safety on the three cultures of aviation." Bangkok, Thailand: Proceedings of the IATA Human Factors Seminar.
Iordache, V.M.
2016
"Dezvoltarea culturii organizaționale pentru îmbunătățirea siguranței și eficienței în cadrul sistemelor aeronautice moderne." Master thesis. Polytechnic University of Bucharest.
Nekoranec, J., Revayova, E
2014
"Organizational culture as part of management work of the military organization." Review of the Air Force Academy, No 2 (26). Romania
Padaki, V.
2003
"Making the organization learn: demystification and management action." Development in practice Journal volume 12, issue 3-4. Marea Britanie: Carfax Publishing.
Rogoway, T.
2015
"Brand new AC-130 Ghostrider a total loss after going inverter while out of control." [online]. URL: http://foxtrotalpha.jalopnik.com/brand-new-ac-130-ghostrider-a-total-loss-after-going-in-1743122173.
Swarts, P.
2016
"Missing flight data contributed to accident that made AC-130J unusable." [online]. URL: https://www.airforcetimes.com/story/military/2016/06/04/missing-flight-data-contributed-accident-made-ac-130j-unusable/85316098/.
Van Dyke, D. L.
2006
"Management commitment: Cornerstone of aviation safety culture." Canada: Concordia University.

MANAGEMENT OF HISTORICAL BUILDING REHABILITATION

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Abstract

Purpose *– One of the objectives of the management is to apply its own principles in practice in such a way that the results achieved be a real success and the organization's profit be an important one.*

Methodology/approach *– The management theories, as in any other field, can also be applied in the field of construction, to find the most efficient solutions for the rehabilitation of existing buildings.*

Findings *– With the help of experts and their knowledge, the manager will always aims to reaching and achieving well-established objectives. A firm may be successful or bankrupt, depending on its management.*

Research limitations/implications *– The paper presents the results of the research on the manager's ability to find the most suitable method of organizing, planning, controlling and coordinating the work so that the activity of the structural rehabilitation process to affect as little as possible the authenticity of the building.*

Practical implications *– This study was based on a historic building. The method chosen must take into account, in particular, the cooperation between old and new materials used, so that no adverse effects may occur over time due to the incompatibility of the building materials used.*

Originality/value *– The whole building was studied on the spot and also, the problems related to degradations that affected the structural system were analysed. A structural calculation was made to determine the rehabilitation solution. The implications of the manager for decision making related to the activities carried out were analysed.*

Key words: *advanced management, structural rehabilitation, historical monuments*

Introduction

In our country, for the most part, the historical buildings are made of brick masonry. The action of time, internal and external factors, the action of climatic factors and particularly disasters, have acted unfavorably on structural and non-structural elements, causing numerous damages. For these buildings, is not easy to find the right rehabilitation solutions. It is important to preserve the exterior appearance of the edifice, and above all, it is important to keep the authenticity of the building components to historical monuments.

The originality of the construction is all the more affected as the larger the intervention. Choosing the right technology and the materials that can be used will be done with great care, to protect the building. Therefore, in these cases, the role of the manager is very important. Making the rehabilitation decision, as well as subsequent implications, are not a simple thing. The manager must have the required skill to use the knowledge and resources available to establish the objectives needed to carry out the activity and to establish appropriate strategies for their achievement.

Methods and criteria needed to determine the rehabilitation solution

For the rehabilitation of a building, it is necessary first to assess the state of degradation and to determine the causes that led to its production, and then to determine the intervention solution. After establishing how to rehabilitation mode, it is determined technology, respectively the effective materials and techniques needed to put the theoretical solutions into practice. Structural consolidation must ensure the safe use of the building and the protection of people's lives [Crişan M., 2003].

The manager draws up documents to decide what to do, how to do, when and who will do it. In order for the proposed objectives to be met, the manager must identify issues, to understand it and find the right solutions to solve them. He draws plans through witch the firm can to decide:

- the constructive solution that would affect the originality of the building as little as possible;
- a good technology to ensures the safe execution of the works;
- choosing the right material which does not involving very high costs;
- using a team of workers who have knowledge of the techniques used in the past and the type of material used;
- ensure an increased productivity of work so that the set duration of the work does not exceeded;
- the planning of the transport works, supply of services and the distribution of materials, be done at the set time so that there are no waiting periods;
- to ensure profitability within the firm;
- ensure a higher quality of the work done, so that the company obtains recognition [Sucală D., 2014].

The manager should also consider the following issues:

a. of a technical nature:

- evolution of constructive techniques;
- knowledge of established rehabilitation methods specific to these types of buildings by using traditional techniques and materials (where possible);
- studying the characteristics of the component materials;
- knowledge of the modern methods of rehabilitation resulting from the numerous researches carried out in this field.

b. of other nature:

- loss of the building's capacity to ensure the safe deployment of its activities, depending on its destination;
- the preservation of material and cultural assets;
- the economic losses suffered by putting the building out of service for a certain period of time;
- influence of climatic and site factors on the structural assembly;
- the importance of continuous use of the edifice for the spiritual life of the community [Stan D., 2004].

Case study - building with brick masonry structure ansamblu

To begin with, an ample review was made which encompasses all the items where access was possible (apart from the foundations where we studied the plans and details in the archive). The rehabilitation solution was mainly determined by the damage status of the building.

In order to determine the most favorable solution for rehabilitation, in these cases, it is not enough to make a simple structural calculation, as in the case of new buildings.

In these cases, the following aspects should be considered, influencing and determining the choice of rehabilitation solution:

- age of construction;
- the material from which the building was made (brickwork);
- the state of conservation of bricks and mortar;
- structural conformation;
- structural changes occurring over time;
- degradation of structural and non-structural elements;
- local geological and geotechnical conditions of the site;
- buildings in the neighborhood;
- modernization works of the traffic routes in the building area;
- disaster action on the edifice (wind, snow, earthquake);
- the occupancy degree of people in the building;
- consolidation work carried out so far.

For buildings with masonry structure in Romania, the requirement of structural strength and stability is generally conditioned by seismic loading [CR6, 2013].

Figure 1. Plan with the original church project

Analysis of behavior to gravitational and seismic actions can be done by considering each element individually or considering the building as a complex unit system. They can be considered as simple structural components (foundations, walls, arches, vaults); complex structural components (wall with window and door gap, tower or bell tower); structural sub-assemblies (resulting from the union of simple structural components and complex structural components into a space system) [Crişan M., 2003].

The structural modeling of the studied objective was carried out in Robot Structural Analysis Professional 2015. The geometric modeling was made on the basis of the data obtained from the survey, which contains exact data on the dimensions of the building and consists of plate-like elements.

The next step was to evaluate the load applied to the construction.

The loads considered were included in the following load hypotheses:

- Own structure weight (G);
- Permanent loads (P);
- Loading from snow (Z);
- Useful load on chorus floor (U);
- Seismic loading in direction X (SX);
- Seismic loading in Y direction (SY).

To make the structural calculation, considering that the structure of the church is made of brick masonry walls, the following material characteristics have been taken into account:

E = 700 MPa; G = 290 MPa; γ = 22 kN/m^3; ν = 0.2; coef.de amortiz.μ = 0.05.

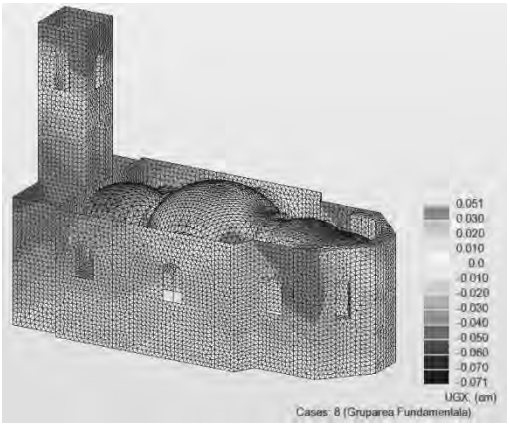
Loading groups were taken according to CRO-2012, namely:

- Fundamental grouping that includes the following uploads:
- Special group 1 which includes the following loads:
- Special group 2 comprising the following loads:

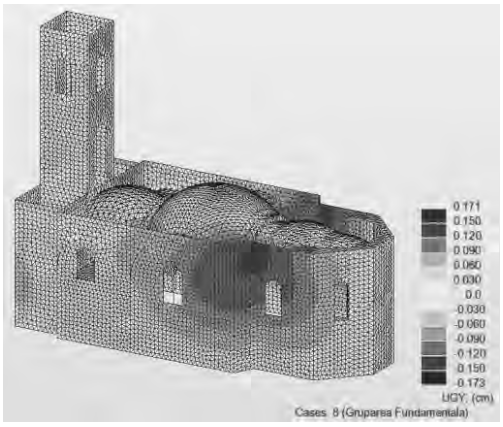
The results of the static calculation are concretized in the following tables and figures.

Table no. 1 - load table

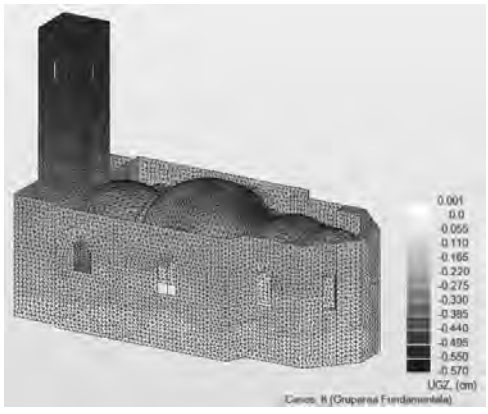
	Case	Load type	List	Load values (m) (kN) (Deg)
	1:Greutate proprie	self-weight	1to113 115to117 119to124 126to128 130to157 225to244 275to294 566to585 678to693 695to700 723to774 824to828 846to879 441 445 900to905 997to1012 1167to1171	' PZ Negative Factor=1.000
	4:Utile	(FE) uniform	1445to1447 4887to4889	' PZ=-3.000(kN/m2)
	2:Incarcari permanente	(FE) linear on edges	1234_EDGE(5) 1377_EDGE(2) 1444_EDGE(2) 2920_EDGE(17) 2922_EDGE(4) 2926_EDGE(3) 2974_EDGE(4) 2976_EDGE(7) 3171_EDGE(3) 3260_EDGE(3)	' PZ=-6.750(kN/m)
	2:Incarcari permanente	(FE) linear on edges	1360_EDGE(3) 1364_EDGE(6) 1375_EDGE(4) 4662_EDGE(3) 4686_EDGE(6) 4677_EDGE(4)	' PZ=-6.750(kN/m)
	3:Zapada	(FE) linear on edges	1234_EDGE(5) 1377_EDGE(2) 1444_EDGE(2) 2920_EDGE(17) 2922_EDGE(4) 2926_EDGE(3) 2974_EDGE(4) 2976_EDGE(7) 3171_EDGE(3) 3260_EDGE(3)	' PZ=-1.470(kN/m)
	3:Zapada	(FE) linear on edges	1360_EDGE(3) 1364_EDGE(6) 1375_EDGE(4) 4662_EDGE(3) 4686_EDGE(6) 4677_EDGE(4)	' PZ=-1.470(kN/m)



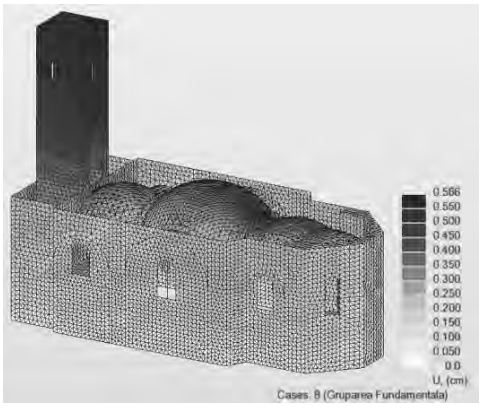
Displacements in direction x



Displacements in direction y



Displacements in direction z

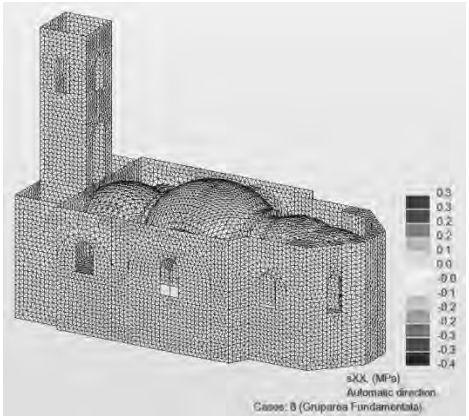


Total displacements

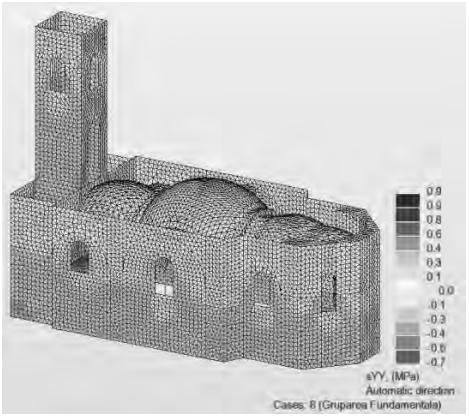
Figure no. 2 - Loading from the fundamental grouping

Table no.2 - Displacements from the Fundamental Grouping

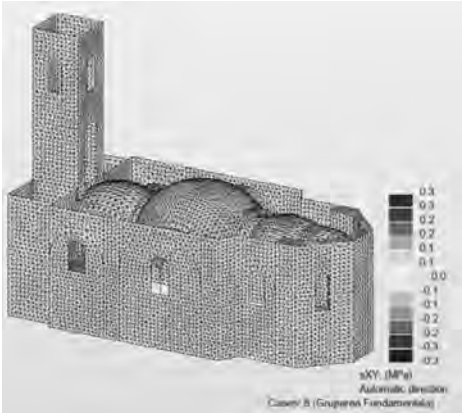
	UX (cm)	UY (cm)	UZ (cm)	RX (Rad)	RY (Rad)	RZ (Rad)
MAX	0.050	0.171	0.001	0.002	0.001	0.001
Node	6115	6108	6778	7625	3683	20862
Case	8 (C)	8 (C)	8 (C)	8 (C)	8 (C)	8 (C)
MIN	-0.071	-0.171	-0.564	-0.002	-0.001	-0.001
Node	5296	6514	15791	7635	27289	20868
Case	8 (C)	8 (C)	8 (C)	8 (C)	8 (C)	8 (C)



Normal tensions X



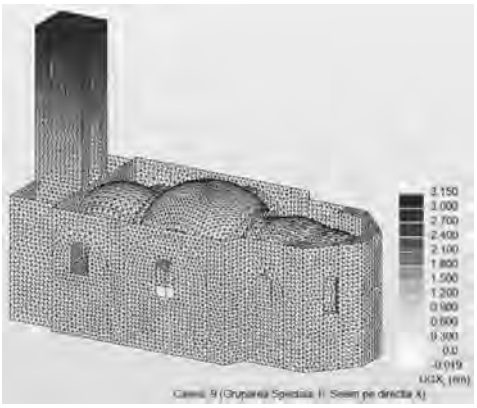
Normal tensions Y



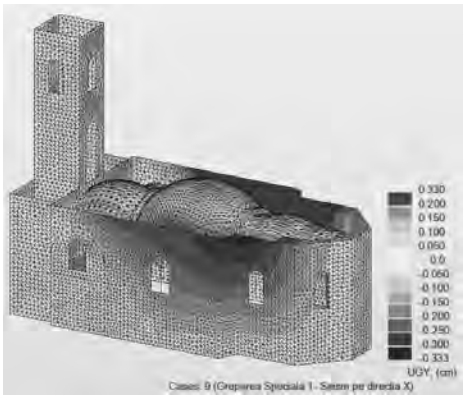
Tangential tensions XY

Table no.3 - Tensions in the Fundamental Grouping

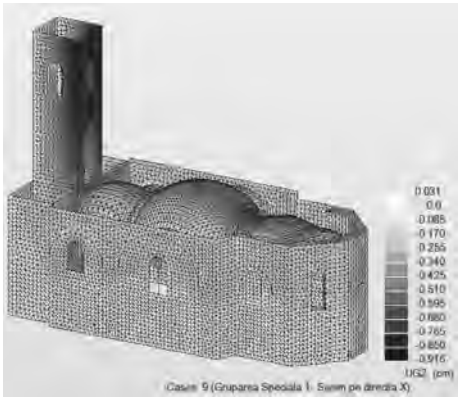
	sXX (MPa)	sYY (MPa)	sXY (MPa)	s1 (MPa)	s2 (MPa)	s(1-2) (MPa)
MAX	0.3	0.9	0.3	0.9	0.1	0.5
Element	24312	23523	24407	23523	24275	23523
Case	8 (C)	8 (C)	8 (C)	8 (C)	8 (C)	8 (C)
MIN	-0.4	-0.7	-0.3	-0.2	-0.7	0.0
Element	15259	21032	24313	27427	20887	8942
Case	8 (C)	8 (C)	8 (C)	8 (C)	8 (C)	8 (C)



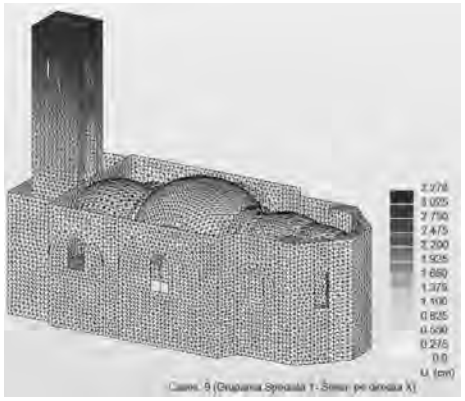
Displacements in direction x



Displacements in direction y



Displacements in direction z

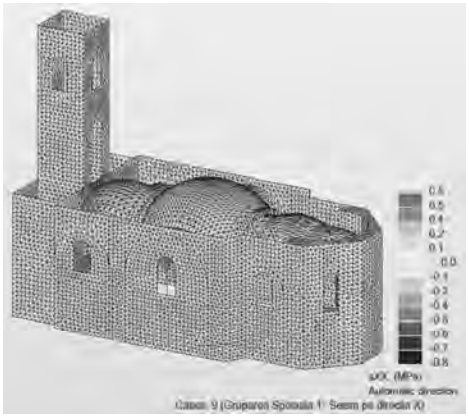


Total displacements

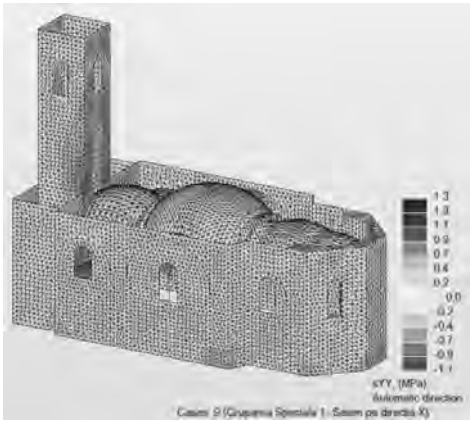
Figure no. 3 - Loading from the special grouping 1

Table no.4 - Displacements from the Special Grouping 1

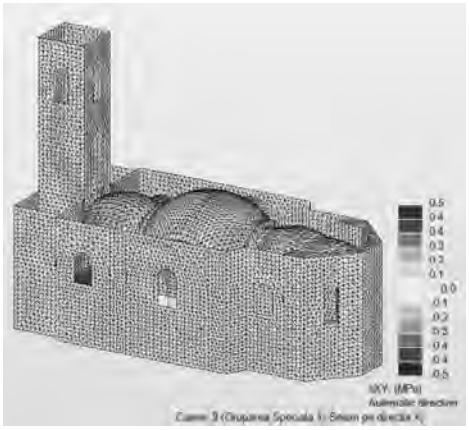
	UX (cm)	UY (cm)	UZ (cm)	RX (Rad)	RY (Rad)	RZ (Rad)
MAX	3.150	0.330	0.030	0.002	0.004	0.003
Node	15791	14689	16817	7625	17201	21066
Case	9 (C) (CQC)	9 (C) (CQC)	9 (C) (CQC)	9 (C) (CQC)	9 (C) (CQC)	9 (C) (CQC)
MIN	-0.019	-0.330	-0.907	-0.002	-0.003	-0.003
Node	3530	1954	15791	7635	25538	21090
Case	9 (C) (CQC)	9 (C) (CQC)	9 (C) (CQC)	9 (C) (CQC)	9 (C) (CQC)	9 (C) (CQC)



Normal tensions X



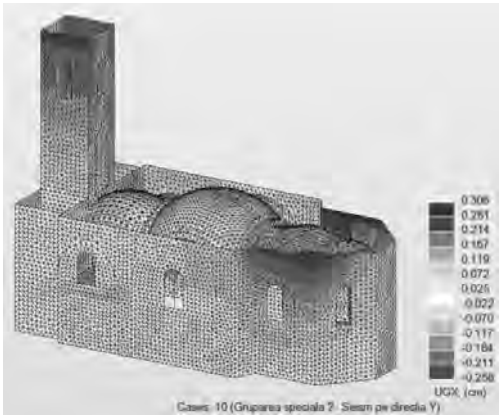
Normal tensions Y



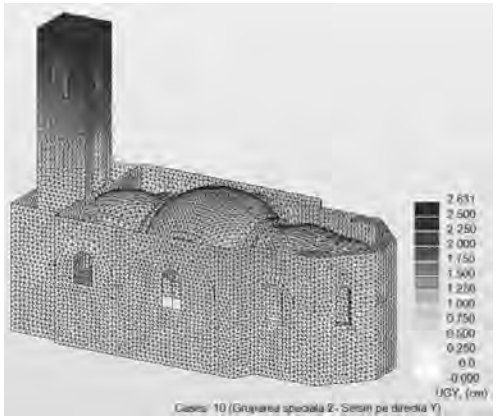
Tangential tensions XY

Table no.5 - Tensions in the Special Grouping 1

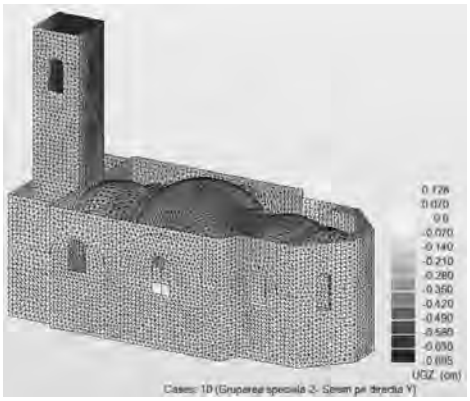
	sXX (MPa)	sYY (MPa)	sXY (MPa)	s1 (MPa)	s2 (MPa)	s(1-2) (MPa)
MAX	0.5	1.3	0.5	1.3	0.3	0.9
Element	23890	23523	24024	23523	23890	23922
Case	9 (C) (CQC)	9 (C) (CQC)	9 (C) (CQC)	9 (C) (CQC)	9 (C) (CQC)	9 (C) (CQC)
MIN	-0.8	-1.1	-0.5	-0.4	-1.1	0.0
Element	14863	23014	23625	22929	23014	6183
Case	9 (C) (CQC)	9 (C) (CQC)	9 (C) (CQC)	9 (C) (CQC)	9 (C) (CQC)	9 (C) (CQC)



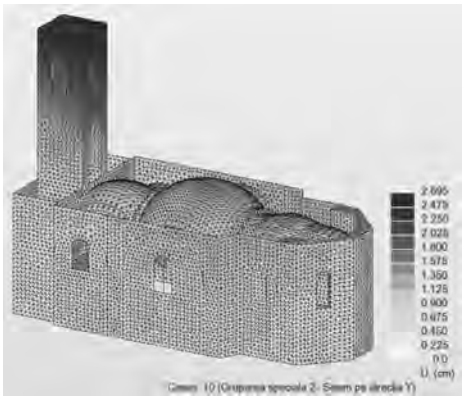
Displacements in direction x



Displacements in direction y



Displacements in direction z

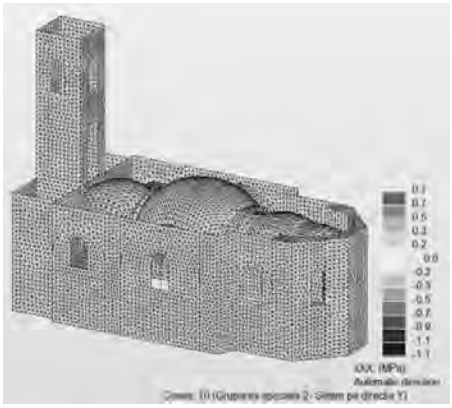


Total displacements

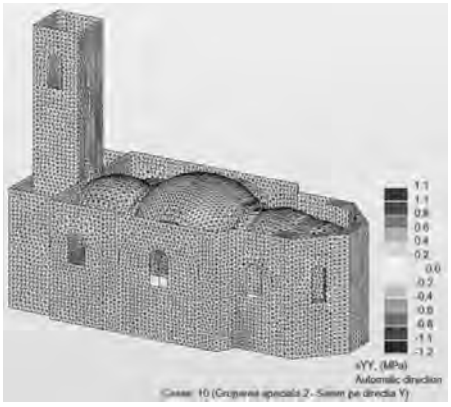
Figure no. 4 - Loading from the special grouping 2

Table no.6 - Displacements from the Special Grouping 2

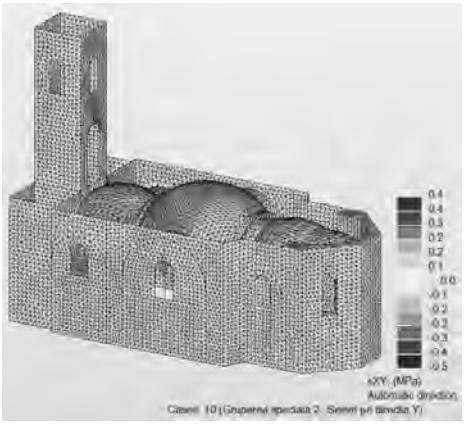
	UX (cm)	UY (cm)	UZ (cm)	RX (Rad)	RY (Rad)	RZ (Rad)
MAX	0.308	2.605	0.127	0.003	0.001	0.002
Node	20002	15852	11517	5228	24275	21101
Case	10 (C) (CQC)	10 (C) (CQC)	10 (C) (CQC)	10 (C) (CQC)	10 (C) (CQC)	10 (C) (CQC)
MIN	-0.258	-0.000	-0.695	-0.004	-0.001	-0.002
Node	19199	6365	16808	17782	21616	21988
Case	10 (C) (CQC)	10 (C) (CQC)	10 (C) (CQC)	10 (C) (CQC)	10 (C) (CQC)	10 (C) (CQC)



Normal tensions X



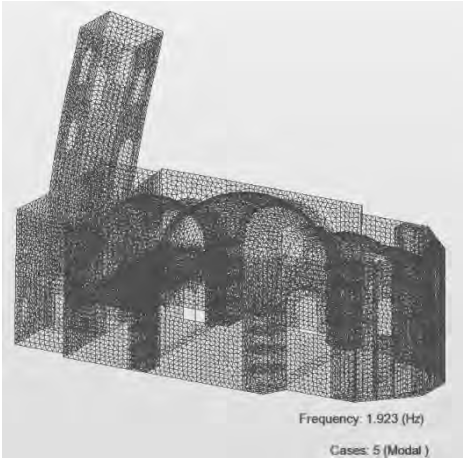
Normal tensions Y



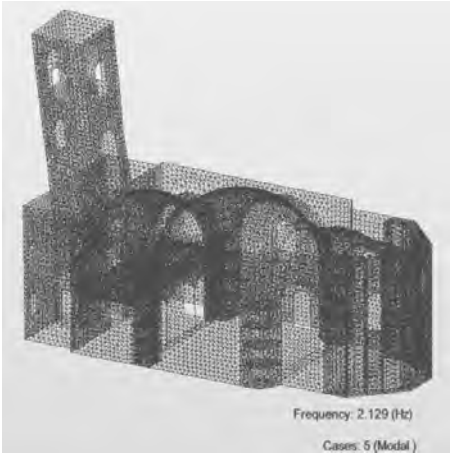
Tangential tensions XY

Table no.7 - Tensions in the Special Grouping 2

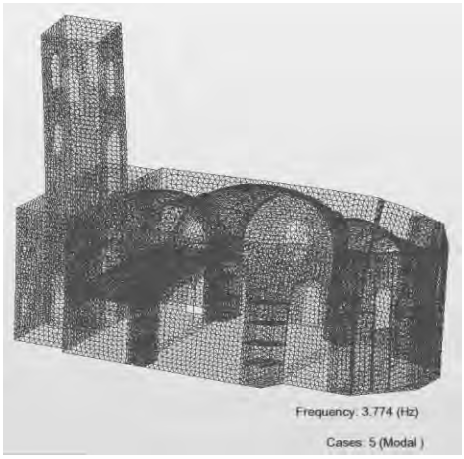
	sXX (MPa)	sYY (MPa)	sXY (MPa)	s1 (MPa)	s2 (MPa)	s(1-2) (MPa)
MAX	0,7	1,1	0,4	1,3	0,4	0,6
Element	23890	24500	19977	23890	23890	19977
Case	10 (C) (CQC)	10 (C) (CQC)	10 (C) (CQC)	10 (C) (CQC)	10 (C) (CQC)	10 (C) (CQC)
MIN	-1,1	-1,2	-0,5	-0,4	-1,4	0,0
Element	15259	19976	23890	20617	19977	32470
Case	10 (C) (CQC)	10 (C) (CQC)	10 (C) (CQC)	10 (C) (CQC)	10 (C) (CQC)	10 (C) (CQC)



Deformations in vibration mode 1



Deformations in vibration mode 2



Deformations in vibration mode 3

Figure no. 5 - Deformations

Table no.8 - Extreme displacements

	UX (cm)	UY (cm)	UZ (cm)	RX (Rad)	RY (Rad)	RZ (Rad)
MAX	3.150	2.605	0.127	0.003	0.004	0.003
Node	15791	15852	11517	5228	17201	21066
Case	9 (C) (CQC)	10 (C) (CQC)	10 (C) (CQC)	10 (C) (CQC)	9 (C) (CQC)	9 (C) (CQC)
MIN	-0.258	-0.330	-0.907	-0.004	-0.003	-0.003
Node	19199	1954	15791	17782	25538	21090
Case	10 (C) (CQC)	9 (C) (CQC)	9 (C) (CQC)	10 (C) (CQC)	9 (C) (CQC)	9 (C) (CQC)

Table no.9 - Extreme tensions

	sXX (MPa)	sYY (MPa)	sXY (MPa)	s1 (MPa)	s2 (MPa)	s(1-2) (MPa)
MAX	0.7	1.3	0.5	1.3	0.4	0.9
Element	23890	23523	24024	23523	23890	23922
Case	10 (C) (CQC)	9 (C) (CQC)	9 (C) (CQC)	9 (C) (CQC)	10 (C) (CQC)	9 (C) (CQC)
MIN	-1.1	-1.2	-0.5	-0.4	-1.4	0.0
Element	15259	19976	23625	22929	19977	8942
Case	10 (C) (CQC)	10 (C) (CQC)	9 (C) (CQC)	9 (C) (CQC)	10 (C) (CQC)	8 (C)

Table no.10 - Table with modal analysis results

Case/Mode	Frequency (Hz)	Period (sec)	Pulsation (1/sec)	Cur mas.UX (%)	Cur mas.UY (%)	Rel.mas.UX (%)	Rel.mas.UY (%)
5/ 1	1.923	0.520	12.085	14.529	0.000	14.529	0.000
5/ 2	2.129	0.470	13.376	0.000	14.376	14.529	14.376
5/ 3	3.774	0.265	23.711	0.000	39.165	14.529	53.540
5/ 4	4.380	0.228	27.521	1.930	0.000	16.459	53.540
5/ 5	4.904	0.204	30.814	0.000	0.016	16.459	53.556
5/ 6	5.688	0.176	35.742	0.000	12.621	16.459	66.177
5/ 7	6.054	0.165	38.036	26.170	0.000	42.629	66.177
5/ 8	6.908	0.145	43.402	14.566	0.000	57.195	66.177
5/ 9	6.913	0.145	43.434	0.001	4.200	57.196	70.377
5/ 10	7.378	0.136	46.359	0.000	0.000	57.196	70.377
5/ 11	8.293	0.121	52.109	12.855	0.000	70.051	70.377
5/ 12	8.617	0.116	54.142	0.028	0.000	70.079	70.377
5/ 13	8.982	0.111	56.433	0.000	0.484	70.079	70.861
5/ 14	9.322	0.107	58.570	0.027	0.000	70.106	70.861
5/ 15	9.384	0.107	58.960	0.000	3.854	70.106	74.715
5/ 16	9.589	0.104	60.249	0.000	5.079	70.106	80.794
5/ 17	9.868	0.101	62.005	0.000	0.000	70.106	80.794
5/ 18	10.100	0.099	63.462	0.000	0.386	70.106	81.181
5/ 19	10.125	0.099	63.616	0.170	0.000	70.276	81.181
5/ 20	10.350	0.097	65.032	7.365	0.000	77.641	81.181
5/ 21	10.546	0.095	66.264	0.000	0.523	77.641	81.704
5/ 22	11.265	0.089	70.778	0.000	0.018	77.641	81.721
5/ 23	11.505	0.087	72.290	0.635	0.000	78.276	81.721
5/ 24	11.567	0.086	72.677	0.000	0.661	78.276	82.383
5/ 25	12.108	0.083	76.079	0.000	0.647	78.276	83.030
5/ 26	12.398	0.081	77.900	0.000	0.000	78.276	83.030
5/ 27	12.437	0.080	78.141	0.000	0.096	78.276	83.126
5/ 28	13.148	0.076	82.609	0.096	0.000	78.373	83.126
5/ 29	13.171	0.076	82.756	0.000	0.754	78.373	83.881
5/ 30	13.388	0.075	84.119	0.000	0.030	78.373	83.911

After making the structural calculation, can be drawn the following conclusions: although the building is about 200 years old, the structural assembly of the building, subjected to gravitational loads and external loads (earthquake, climatic actions, landscapes of the foundation ground), performs satisfactorily. The calculation shows that this building is classified as seismic risk class RsII. This class corresponds to those buildings where major structural degradation may occur in the event of an earthquake, but its action on the building is unlikely to lead to a loss of overall building stability.

In order to ensure the safety of the structure in the event of an earthquake, it is necessary to carry out interventions that include: repair works and structural consolidation works. Repair works are carried out for the purpose of rehabilitating degraded structural or nonstructural material. The structural

interventions needed to building consolidation must be thought and built such that preserve the monuments characteristics.

In this case, in order to preserve the building's characteristics as best as possible, the proposed structural rehabilitation solution is based on the insulation method at the base of the building.

Conclusions

The purpose of consolidation is to ensure the strength and stability of building elements, for protect both material and cultural assets and to protect people's lives. By using available resources and applying quality management, together with the manager's ability to find innovative solutions, all these have an important role in determining the solution adopted. A good manager must have the training and the necessary skills to combine the theoretical knowledge gained with the practice of many fields. He also he has to capitalize on these qualities to obtain simple, safe, durable, effective and easy to use solutions anywhere, for any situation and at any time.

The role of managers is to ensure the necessary exhibition framework for the activity and the achievement of the general objectives of the company.

References

Crişan, M.,
2003
"Restaurarea Structurală a clădirilor de cult ortodox din Tara Românească şi Moldova",
Editura Universitară "Ion Micu", Bucureşti.
Costea, V., Ceatarâş, D.,
2004
"Management", U.T. Press, Cluj-Napoca.
CR6
2013
"Cod de proiectare a structurilor din zidărie portantă".
Indicativ P100-1
2013
"Cod de Proiectare Seismică", partea I, Prevederi de proiectare pentru clădiri.
Niculiţă M., Groll L.,
2007
"Consolidarea clădirilor din patrimoniu", Editura Societăţii Academice „Matei-Teiu Botez”, Iaşi.
Mircea, A.T.,
2016
"Study upon Applying Multi-Criteria Analysis to the Selection of Building Materials" Paper presented at the 28th IBIMA Conference "Vision 2020: Innovation Management, Development Sustainability, and Competitive Economic Growth", Seville, Spain.
Sucală, D.,
2014
"Reabilitarea seismică a clădirilor din zidărie prin izolarea seismică a bazei"- Doctoral Thesis.
Stan, D.,
2004
“Reabilitarea clădirilor de cult”**,** Editura Matrix ROM, Bucureşti.

RESEARCH ON KEY FACTORS IMPACTING THE PERFORMANCE OF ORGANIZATIONAL INNOVATION – PILOT STUDY ON ROMANIAN ENTERPRISES

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Abstract

Purpose *– the paper tackled the concern for organizational performance and investigated the main factors responsible for hampering the development of innovation concerning Romanian enterprises.*

Methodology/approach *– the study was focused on a secondary research on new developments of innovation at EU level and performed a primary research on 70 Romanian enterprises, analyzing main factors impacting actual and future organizational innovation approaches.*

Findings *– the results quantified the problems with respect to commercialization of innovative goods and services, introducing several perspectives on the future investments in organizational innovation.*

Research limitations/implications *– the study is limited to the respondent's opinions related to previous organizational experience in the area of commercialization of innovative goods and services, reasons to invest in innovation strategies, and the perceived role of innovation in the working settlements.*

Practical implications *– the research results underlined the current activities and attitudes related to in-house innovation, capturing the main factors hampering the innovation potential in the Romanian market. The authors introduced several perspectives on the future investments in organizational innovation and their impact on competitiveness and on progress toward economic growth.*

Originality/value *– the study attempts to contribute to the debate about the role of management science toward innovation performance and sustainable development.*

Keywords: *innovation performance, organizational innovation, competitiveness, sustainable development.*

Introduction

The European Union business environment increasingly demands innovation and actions to enhance productivity to support the growth and competitiveness of enterprises, regardless of types, size and operating sector. The innovation in the organizational settlement is essential for job creation, productivity gains and new market opportunities, being, in fact, an engine of sustainable and inclusive growth in Europe.

Since the EU economic success depends on the competitiveness and growth of enterprises, the research and innovation actions become important drivers of non-price competitiveness, leading to increased demand for goods and services based on the development of new, improved or differentiated products or services.

In this regard, harnessing the potential of organizational innovation to generate growth is crucial for achieving the targets of Europe 2020 strategy for smart, sustainable and inclusive growth. According to Eurostat, SMEs (Small and medium-sized enterprises) are generating almost 50% of the total value added in the non-financial business economy, providing 80% of all new jobs in Europe over the past five years (European Commission, 2011).

Research problem

"The Challenges to Member States' Investment Environments" identified associated challenges that countries face, in the attempt to create the country-specific investment profiles to be further analyzed. Through five broad categories (i.e. public administration/business environment; labour market/education; financial sector/taxation; research, development and innovation; and sector specific regulation) there have been proposed several appropriate measures to be taken by each member state to accelerate progress and convergence (Commission Staff Working Document, 2015).

As far as research, development and innovation, the cooperation between academia, research and business are seen as the major approach addressing the lack of expertise in creating spin-offs in universities, as well as in offering alternative forms of financing (i.e. business angels, crowd-funding, venture capital).

Looking at Romania circumstances, "the European Semester 2018" acknowledged the challenges this country is facing with regard to innovation performance in different economic sectors. Despite some appropriate measures taken, Romania is still lagging behind, having a limited knowledge transfer from public research to businesses and a modest business investment in R&D. The main barriers to be addressed are related to innovators enablers, firm investments, and finance and support (Commission Staff Working Document, 2018).

In the same line, the European Innovation Scoreboard 2017 acknowledged Romania as being a modest innovator, scoring below the EU average in all indicators analyzed such as doctorate graduates, international scientific co-publications, R&D expenditure, SME innovation, medium and high-tech product export, while having a dynamic start-up ecosystem (European Commission, 2017).

A comprehensive analysis of Romania′s innovation performance underlined the lowest value of expenditure in research & development in the past years (0.48% of GDP in 2016, 0.49% in 2015 and 0.38% in 2014) which negatively impacted the business competitiveness. Moreover, the reluctance of enterprises to engage in research and innovation activities indicates a low level of academia-business cooperation and a weak commercialization of research results (i.e. R&I funds invested by business were 0.18% of GDP in 2015 versus EU28 average of 1.12% in 2013). Also, the study noted the small number of top firms with R&D spending, the low average of R&D spending of these firms, coupled with a lower share of employment in High and Medium high-tech manufacturing and a larger share of enterprise births (Chioncel and Del Rio, 2018).

Multiple studies dedicated to important drivers of competitiveness through research and innovation indicated that knowledge economy built on a richer, more productive, and economically efficient country may create the competitive advantage of business sector, improving all aspects of sustainable development: economic prosperity, environmental issues and personal well-being (Dima et al., 2018).

Some scholars, tackling a narrower approach when studying different facets of innovation, have highlighted the Romanian SMEs behaviors adopted to ensure business preservation by reducing exposure to investment in innovation (Iancu et al., 2017). Others mentioned the role of innovation and new firms creation in the growth rate of Romanian country, as well as the need to build a decentralized economy which may lead to the economic development convergences between regions (Busu, 2017).

Under these circumstances, the paper tackled the issues of organizational innovation and investigated different factors responsible for hampering the innovation potential in the Romanian business sector.

Research methodology

The paper methodological approach consisted of designing a primary research questionnaire-based on Romanian enterprises from different business sectors to assess the main factors impacting actual and future organizational innovation approaches. The data collection consisted of an online survey distributed to 400 organizations active in the Romanian business environment and only 70 enterprises filled in the questionnaires.

The study is limited to the respondent's opinions related to previous organizational experience in the area of commercialization of innovative goods and services, reasons to invest in innovation projects

and strategies, and the perceived role of innovation in the working settlement. In this regard, Table 1 shows the research map with variables accountable for organizational innovation performance, measurement scales and scaling techniques.

Table 1. The research map with organizational innovation variables

Objectives	Research variables	Operational variables	Measurement scales & scaling technique
O1. Assessing main factors impacting organizational innovation in 2016-2017	1. Problems in the commercialization of innovative goods or services	• A market dominated by established competitors • Lack of financial resources • Cost of meeting regulations • Lack of human resources • Administrative/legal burdens • Low demand for innovative goods/services • Lack of marketing expertise • Weak distribution channels • Finding/using new technologies	Ordinal scale & Likert techniques
	2. Solution to overcome obstacles/issues related to commercialization of innovative goods or services	• Training of staff • Online selling • Promotion through specialized channels • Compliance with regulation and/or standards • An active presence on international markets • Intellectual property rights • Market-testing a product or services before launch	
O2. Assessing main factors impacting future organizational innovation	3. Future organizational innovation actions	• Processes (production, distribution, HR, financial, R&D) • Services • Organizational methods • Marketing strategies (packaging, promotion, placement, pricing)	Nominal scale & frequency distribution
	4. Main reasons for investing in organizational innovation	• Market potential • Customer request • Increased competition • New legal and/or administrative requirements coming into force in the coming years • Offering a new business solution	
	5. Importance of innovation area	• Production • Marketing • Commercial • Research & Development • Human Resources	Ordinal scale & Likert techniques
	6. The role of innovation strategy in the organization	• The central point of reference • Integral part • Enhance appearance and attractiveness • Lack of systematical approach • Not used	
Demographic profile	7. Organization type	Private/State-owned/Autonome state companies/Non-profit association (NGO)	Nominal scale & frequency distribution
	8. Organization size	• < 10 employees • 11 – 50 employees • 51-250 employees • > 250 employees	
	9. Organization turnover	• < 50.000 euro • 50.001-100.000 euro • 100.001-500.000 euro • > 500.000 euro	
	10. Organization sectors group (NACE)	• Manufacturing (C) • Retail (G) • Services (H/I/J/K/L/M/N/R) • Industry ((D/E/F)	
	11. Respondents job/function	Top manager/middle manager/ execution	

To analyze the respondents' opinion regarding problems and related foreseen solutions for commercialization of innovative goods and services, it has been used a 4-point Likert scale from 1-not important/relevant to 4-very important/relevant.

To assess the factors impacting future organizational innovation it has been used the nominal scale to quantify the degree of future innovation actions and main reasons for investing in innovation. Secondarily, the 4-point Likert scale was applied to quantify the degree of importance for different innovations areas and also to quantify the role of innovation strategy in the organization settlements.

Results and findings

The demographic structure of the sample is based on 74% private organizations, 15% NGOs, 10% state-own companies, and only 1% as autonomous state companies. The respondents come from big companies (49% of the sample), followed by 34% from SMEs, and only 17% from medium-sized enterprises. The operating sectors were mostly represented by service sector (72%), followed by manufacturing with only 23% of answers. The retail sector was represented by only 5% of respondents and no industry company responded to the survey. As regard job level, 38% of respondents had leading positions, 29% of them with middle management responsibilities, and the other part of 33% coming from execution level.

The results of data analysis indicated that Romanian enterprises are dealing with the shortage of skilled workforce (3.32 weighted score for the lack of human resources) and with significant obstacles in the pursuit of commercialization of innovative goods and services arisen from a business market dominated by established competitors (3.25). Also, the lack of financial resources (3.20), costs of meeting regulations (3.07) and the issues of finding new technologies (3.1) were mentioned as being key issues hampering the innovation potential of businesses (Table 2).

Looking at the possible solutions to overcome innovation obstacles, the Romanian enterprises considered as feasible options the improvement of online selling (3.57) and the compliance with regulations and standards (3.57), followed by training of company staff (3.51) and an active presence on international markets (3.42), as presented in Table 2.

Table 2. The weighted scores for factors impacting organizational innovation in 2016-'17

Variables	Operational variables	1 points	2 points	3 points	4 points	Weighted scores
Innovation issues	Market dominated by established competitors	0	16	20	34	3.25
	Lack of financial resources	6	10	18	36	3.20
	Cost of meeting regulations	5	15	20	30	3.07
	Lack of human resources	1	7	30	32	3.32
	Administrative/legal burdens	5	17	30	18	2.87
	Low demand for innovative goods/services	8	14	32	16	2.88
	Lack of marketing expertise	2	20	24	24	3.00
	Weak distribution channels	2	20	32	16	2.88
	Using new technologies	3	11	32	24	3.10
Innovation solutions	Training of staff	0	0	34	36	3.51
	Online selling	0	0	30	40	3.57
	Promotion by specialized channels	4	10	32	24	3.08
	Compliance with regulation and/or standards	0	2	26	42	3.57
	Active presence on international markets	0	2	36	32	3.42
	Intellectual property rights	0	4	26	40	2.94
	Market-testing a product or services before launch	4	6	22	38	3.34

With regard to main factors impacting future organizational innovation, 57% of respondents appreciated the improvements of organizational processes (research & development, production, distribution, human resources, and financial), whilst 24% chose the optimization of marketing strategies (product, placement, price, and promotion). Moreover, the improvement in organizing activities was selected by 16% of the sample, and only 3% of them marked the improvement of services.

Among different reasons to invest in organizational innovation, the market potential was indicated by 60% of enterprises compared to customer request and new legal and/or administrative requirements coming into force in the coming years, selected by only 8% of them. The other investing reasons for innovation, as increased competitions and new business opportunities, were pointed out by 12% of respondents each.

To further analyze the future organizational innovation (Table 3), the respondents appreciated research and development as being the most important innovation area (3.77) followed by production (3.64) and marketing (3.37). The data also show that the enterprises seem to appreciate the innovation strategy as being a central point of reference (3.14) and an integral part of organizational activities (2.77).

Table 3. The weighted scores for factors impacting future organizational innovation

Research variables	Operational variables	1 points	2 points	3 points	4 points	Weighted scores
Innovation area	Production	1	1	20	48	3.64
	Marketing	4	4	24	38	3.37
	Commercial	6	8	20	36	3.22
	Research & Development	0	0	16	54	3.77
	Human Resources	2	6	20	38	3.22
Role of innovation strategy in the organization	Central point of reference	0	14	32	24	3.14
	Integral part	4	20	34	12	2.77
	Enhance appearance and attractiveness	4	22	34	10	2.71
	Lack of systematical approach	24	22	12	14	2.28
	Not used	4	44	16	6	2.34

By summing up the findings, these results explore and quantify the problems with respect to the commercialization of innovative goods and services, through several factors responsible for innovation such as: degree of market competition, availability of financial resources, cost of meeting regulations and sector-specific standards, lack of skilled workforce, administrative and legal burdens, distribution channels, the usage of new technology, and intellectual and property rights.

Conclusions

Organizational innovation and commercialization of innovative goods and services play an important role in stabilizing employment growth leading to economic and social progress. The research results underlined the current activities and attitudes relate to in-house innovation, capturing the main factors hampering the innovation potential.

For Romania country, the limited concern for innovation is explained by the structure of its economy with the prevalence of low and medium-technology sectors (e.g. leather, textiles, consumer goods,

agro-food, and basic metals) and by the reluctance of business sectors to invest in research and innovation activities.

In this regard, the innovation challenges are still remaining for those Romanian enterprises which strive to expand their operations in new markets by investing in technology adoption, internationalization and scaling-up of their activities. Besides this, the investment in research and innovation should be complemented by a systemically approach to boost innovation performance. By making the organizational innovation strategy a central point of reference, the enterprises link the innovation opportunities and factors hampering innovation with their particular context in an attempt to avoid fragmentation, unpredictability and uncertainty in innovation performance.

References

Busu, C., Busu, M.
2017
"The Role of Knowledge Intensive Business Services on Romania's Economic Revival and Modernization at the Regional Level." Sustainability, 9, 526.

Chioncel, M.F., Del Rio, J.C.
2018
"RIO Country Report 2017: Romania", EUR 29169 EN, ISBN 978-92-79-81280-4, doi:10.2760/4105, JRC111316, Luxembourg: Publications Office of the European Union.

Dima, A.M., Begu, L., Vasilescu, M. D., Maassen, M. A.
2018
"The Relationship between the Knowledge Economy and Global Competitiveness in the European Union." Sustainability, 10, 1706.

European Commission, Eurostat Pocketbook
2011
"Key figures on European business – with a special feature on SMEs"
http://ec.europa.eu/eurostat/web/products-pocketbooks/-/KS-ET-11-001

European Commission, DG for Internal Market, Industry, Entrepreneurship and SMEs
2017
"European Innovation Scoreboard 2017"
https://ec.europa.eu/docsroom/documents/30697

European Commission, Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committees of the Regions, SWD (2018) 221 final
2018
"2018 European Semester: Assessment of progress on structural reforms, prevention and correction of macroeconomic imbalances, and results of in-depth reviews under Regulation (EU) No 1176/2011"
https://ec.europa.eu/info/sites/info/files/2018-european-semester-country-report-romania-en.pdf

European Commission, Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committees of the Regions, SWD (2015) 400 final
2015
"Challenges to Member States' Investment Environments"
https://ec.europa.eu/futurium/en/system/files/ged/32-_swd_-barriers_to_investment_in _ms.pdf

Iancu, A., Popescu, L., Vasile, T., Popescu, V.
2017
"Innovation-a factor for increasing the competitiveness of Romanian SMEs." Review of Management and Economic Engineering, Vol. 16 (4): 619-627.

THE FACTORS THAT AFFECT THE PROCESS OF INTEGRATION AND APPLICATION OF THE ICT PROGRAM IN THE ARAB EDUCATION SYSTEM IN ISRAEL

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Abstract:

Purpose *– The article explores the connection between the level of the teacher's pedagogic technical knowledge and assimilating an ICT program in school in the Arab sector in Israel, and the impact of the teachers' attitudes on assimilating ICT programs.*

Findings *– The research findings indicate that when the teacher thinks that the change is correct, and that it is worthwhile for the system to assimilate it better, one can understand that the teacher's readiness for change is most important.*

Research limitations/implications *– One can thus learn that the teacher's trust in the goals of the change is crucial in order for it to be effective. Although the change is in the ICT field, the research findings hone the need to emphasize the pedagogic aspect and the extent of its impact on the success of assimilating and applying the ICT.*

Keywords: *ICT (Integrating Computer Technologies), ICT program, education system, Arab education system, integration, application.*

Introduction

Integrating computer technologies (ICT) in the education system as Mioduser, Nachmias. Tobin & Forkosh (2006) states is likely to have extensive implications on a variety of domains, such as school life, the organization of time and space, the student's role, the teacher's role and the curriculum etc.. Much research on the subject present difficulty in assimilating processes of change in teaching modes and their implementation in schools in general, and in Arab schools that are considered particularly traditional.

Abu Asba (2007) states that despite the progress in the process of integrating computers in education, there is still a disparity between the promise embodied in the information and the ICT revolution and the reality in practice in schools in the Arab sector that suffers from discrimination in budgets for decades. According to Cuban (2001) in recent years, many teachers and students have confirmed that there has indeed been an increase in the use of computers within the classrooms due to increased access to computers, to teacher training, and computer-encouraging policies, but mainly through basic operations such as using a word processor for writing, developing presentations, seeking information on the network, and using electronic mail.

Palak & Walls (2010) and Hills (2009) has stated that it is important to note that the extent of ICT in the education system in more advanced methods – solving problems using computerized methods, the use of computerized laboratories, managing a classroom internet site, learning together and so on, was lower than expected.

While de Freitas & Veletsianos (2010) and Selwyn (2010) has sown that many factors influence ICT in the education system, such as attitudes, perceptions, abilities, and teachers' beliefs, towards the digital environments and towards their role in teaching in these environments, and afford key factors that have an impact on the practice of ICT during classroom teaching to assimilate processes of change in teaching methods in schools.

The reasons for difficulties on assimilating ICT in the education system can be divided into two general categories, organizational and administrative, and factors associated with the teaching staff.

An example of an organizational aspect is the structural and operational preparedness of the school to instil change. According to Venezky & Davis (2002) The prevailing assumption is that there can be no significant change in the education process without structural changes, such as, distribution of classes, flexibility in the content of study units, adjustment of physical learning infrastructures and peripheral equipment, with reference to quality and availability.

The school principal is a key factor influencing changes. Promoted programs encouraged by the principal are more likely to succeed so that the principal provides the vision, directs the teachers towards common goals and drives the necessary resources to promote change.

Marsh (2001) states that many studies have indicated that projects and programs that are encouraged by the manager who have received their support have had very high chances of success due to his involvement, which has been perceived as increasing the seriousness of the project, providing psychological support and mobilizing the necessary resources.

AL-Harbi (2014) and Ghamrawi (2013) found that the principal plays a central role in ICT implementation. For example, if the principal does not provide adequate support and encouragement to teachers, it is not possible to create a good working environment to motivate teachers to experiment with information and communication technologies in their classrooms. In addition, Levin and Dudney (2005) confirm that if the principals 'and teachers' beliefs are not constructive in relation to the implementation of ICT, it is reasonable to assume that ICT will not be accepted at all or will be implemented only partially in schools.

Fullan (2006) indicate that entities that interact with the school, such as the local authority and the Ministry of Education, influence the integration of technology there. It can be seen that the multiplicity of entities involved in the processes of change creates great complexity, and frequently the result is requirements that do not correspond to actual reality, simplistic solutions and inconsistency in performance.

Rogers (2003) argues that the process of adopting innovation is multi-stage: a slow pace at the beginning of the process, then dramatic acceleration, peaking, and then the slowing again. Since the use of basic applications prior to advanced applications, it is not yet possible to obtain the desired educational changes (Ertmer 2005).

Bingimlas (2009) stressed several obstacles, in his study, that may limit the integration of ICT in educational institutions. For example, an increasing number of students in the classroom, inadequate information and communication technology equipment, along with inadequate technical support and maintenance, include lack of incentives for teachers to employ ICT in their classrooms.

Research questions

The following three questions were examined:

- Is there a connection between the teacher's pedagogic knowledge level and the implementation of the ICT program?
- Is there a connection between each of the components of technological pedagogic knowledge for implementing the ICT program?
- What is the degree of influence of the teacher's attitudes regarding the change in the assimilation of the ICT program?

Methodology

The research population

The study population consists of 147 teachers from six elementary schools who participated in the ICT program in the 2007 academic year. All teachers have a "computer for every teacher". The population of the six primary schools is of a low-moderate socioeconomic status, and it is possible that not all students have a computer at home. In the school there are very active computer labs that enable students to experiment with online assignments with the class educators.

Research tools

The study used a self-report questionnaire based on Archambult & Crippen (2009), which included the teachers' demographic data. The questionnaire included several parts:

A. Knowledge of pedagogic content

Shulman (1986) and Mishra & Koehler (2008) both state that a conceptual framework for good teaching that included "good pedagogic knowledge" that assumes that at the heart of a good teaching lie three components: content, pedagogy and technology, and the essence of assimilation is related to the relationship and interaction between the three knowledge bases.

B. A questionnaire to examine teachers' attitudes toward change

A questionnaire according to Avidov Ungar & Friedman (2011) that examined the relationship between "pedagogical knowledge and technological content" and the attitudes of teachers toward change, and the connection between teachers' perception of the school as a learning organization, and their attitudes toward change.

C. ICT Implementation questionnaire

A questionnaire based on questions from Peled and Magen Nagar (2012), which investigated differences in skill level, ICT and attitudes toward ICT among teachers in schools demonstrating ICT for regular schools.

D. Method of data analysis

In this framework, the analyses were performed using SPSS 19. Data coding and statistical processing was done using descriptive statistics, so that the background data examined the prevalence distribution, averages, standard deviations, standard and distribution ranges, including Pearson coefficients aimed at finding connections between the various research variables.

Findings

A. Implementation of the ICT program

Teachers report a medium-high level of ICT implementation in their school (3.73 on the scale of 1-5). In Table 1 below. Averages, Standard deviation, Minimum Score Maximum Score, application of ICT.

Table 1: Averages, Standard deviations, minimum and maximum values in the ICT implementation questionnaire

Variable	N	Average	SD	Min. Score	Max Score
ICT impl	147	3.73	0.69	2.05	5.00

B. The teachers' attitudes towards change

The general attitude of teachers towards the change taking place in the school with the entry of ICT is perceived as positive (3.99 on a scale of 1-5 scale). The highest rating in the questionnaire was afforded to the behavioural component (4.41) and the rating and the lowest rating (3.85) was afforded to the emotional component.

C. The teachers' level of technological pedagogical knowledge

There is a high level of contextual pedagogical knowledge among teachers (4.18 on the 1-5 scale), (4.07 on the 1-5 scale), and pedagogical knowledge (4.19 on scale 1-5). A low level was reported in the technological knowledge category (2.71 on a scale of 1- 5) and a medium level of knowledge was reported in categories of pedagogical technological knowledge (3.58 on a scale of 1-5) and technological pedagogical content knowledge (3.53 on a scale of 1-5).

D. The relationship between technological pedagogical knowledge (TPACK) and the implementation of ICT

All the components of the knowledge were found to have a significant positive correlation with the implementation of the ICT program. That is, the higher the level of technological pedagogical knowledge, the greater the assimilation of the ICT program in the school.

The most prominent categories are technological pedagogical content knowledge (0.61), technological pedagogical knowledge (0.49) and technological knowledge as areas of knowledge (0.52) (see Table 2 below.)

Table 2: Pearson's correlations between technological pedagogical knowledge and the implementation of ICT in school

TPACK knowledge	Implementing ICT program
Pedagogical knowledge	0.27 **
Technological knowledge	0.19 *
Knowledge in the field of knowledge	0.26 **
Technological knowledge in the field of knowledge	0.52 **
Pedagogical knowledge in the field of knowledge	0.42 **
Technological pedagogic knowledge	0.49 **
Knowledge of technological pedagogic content	0.61 **

E. The relationship between attitudes toward change and the implementation of ICT in the school

Among the general attitude of the teachers in the ratio ($r = 0.42$, $p < 0.01$) there was a positive and significant relationship with a moderate intensity of change and the implementation of the ICT program. Thus, the greater the extent to which the respondents are satisfied with the change taking place in the school with the introduction of the ICT program, the greater the degree of assimilation of the ICT program in their school.

An examination of the relationship between the ICT application variable and the three other factors indicates that positive relationships exist ($R = 0.48$, $p < 0.01$) and the cognitive domains ($r = 0.46$, $p = 0.01$) are shown in Table 3.

Table 3: Pearson correlations between attitudes toward change in ICT implementation

Attitudes towards change	Implementing ICT programs
General positions	0.42 *
Emotional field	0.48 *
Behavioural domain	0.08
Cognitive field	0.46*

Summary and discussion

The goal of the study was to examine what is required of the teacher's knowledge in order to assimilate ICT and whether without the appropriate level of knowledge, but with the willingness to introduce change in teaching, the teacher will be able to implement ICT effectively.

The results of this study, similar to that of Avidov Ungar and Arazi (2014), which encompassed schools from the Jewish sector, found that the higher the level of technological pedagogic knowledge, the higher the level of computer assimilation among teachers. It was also found that the level of pedagogic knowledge, contextual knowledge, and pedagogical knowledge of teachers is high. On the other hand, it was found that the level of technological pedagogical content knowledge, pedagogical technological knowledge and technological knowledge among teachers is low. It can be seen that the teachers' pedagogical knowledge is very important for the assimilation of ICT.

The research findings also hone the essential differences between school roles and ICT implementation.

There was also a significant difference between educators and professional teachers. It was found that educators report a higher degree of ICT implementation. There were also differences between professional teachers who specialize in English and science. It was found that science teachers reported a higher degree of program implementation compared to English teachers. From this we learn that it is possible that ICT training is primarily focused on classroom educators. The assimilation of ICT is at an early stage, which is still not implemented by professional teachers, is also possible.

Moreover, the more positive the teachers' position on the change in the ICT program, the greater their degree of assimilation of the ICT program in their schools. There is also a moderately positive relationship between the emotional and cognitive domains versus the behavioural field. The teacher expresses and thinks that the change is necessary and correct, even if he does not show it in his behaviour. The more the teacher thinks that the change is correct, and feels that the change is worthwhile for the system, the better it will be assimilated. From this we can learn that teachers' willingness to change, pedagogic knowledge, and teacher confidence in the purpose of change is very important for the change to be effective (Donnelly, McGarr & O'Reilly, 2011).

The findings of the study stress the need to emphasize the significance of pedagogy in implementing the change, although the change is in the field of ICT, the pedagogical aspect of the teacher's work is at the core of the process of assimilation and implementation of ICT (Ertmer & Ottenbreit-Leftwich, 2010).

References

Abu Asba, H.
2007
Arab education in Israel: Dilemmas of a national minority. Jerusalem, the Floersheimer Institute for Policy Studies. (Hebrew)

Al-Harbi, H.
2014
Towards successful implementation of ICT in education. The 2014 WEI International Academic Conference Proceedings, April, 2014 Vienna, Austria. The West East institute, pp. 33-46.

Archambault, L., & Crippen, K.
2009
Examining TPACK among K-12 online distance educators in the United States. Contemporary Issues in Technology and Teacher Education, 9(1), 71-88.

Avidov-Ungar, A., & Arazi-Cohen, F.
2014
What Affects the Implementation of ICT in school? Technological Pedagogical Knowledge of the Teacher (TPACK), Attitudes towards change and implementing ICT. In, Y. Eshet-Alkalai A. Kaspi, N. Gari, Y. Kalman, & V. Zilber-Varod (Eds.), The 9th conference of TPACK. Raanana, Israel, Open University, pp. 72-75. (Hebrew)

Avidov-Ungar, A., & Friedman, Y.
2011
Empowering teachers – essence and examples. Information available for professionals. Jerusalem, The Henrietta Szold Institute. (Hebrew)
Avidov-Ungar, O.
2012
The Implications of teachers' professional attributes on assimilating a computerized learning and management system in an Israeli school: A case study. Creative Education, 3(08), 116-119.
Bingimlas, K.A.
2009
Barriers to the successful integration of ICT in teaching and learning environments: A review of the literature. Eurasia Journal of Mathematics, Science & Technology Education, 5(3), 235-245.
Caspi, A., Gary, N. , Kelman Y., & Silber Varod, V., (Eds.)
2014
Proceedings of the 9th Chase Conference on Researching Innovation and Learning Technology. Raanana, The Open University, pp. 10-17. (Hebrew)
Cuban, L.
2001
Leadership for student learning: Urban school leadership - Different in kind and degree. Institute for Educational Leadership, Washington
De Freitas, S., & Liarokapis, F.
2011
Serious games: a new paradigm for education? In M. Ma, A. Oikonomou, & L.C. Jain (Eds.), Serious Games and Edutainment Applications (pp. 9-23). Springer, London.
De Freitas, S., & Veletsianos, G.
2010
Crossing boundaries: Learning and teaching in virtual worlds. British Journal of Educational Technology, 41(1), 3-9. Rogers, E.M. 2003. Elements of diffusion. Diffusion of innovations (5th Ed.). New York: Free Press.
Donnelly, D., McGarr, O., & O'Reilly, J.
2011
A framework for teachers' integration of ICT into their classroom practice. Computers & Education, 57(2), 1469-1483.
Ertmer, P.A.
2005
Teacher pedagogical beliefs: The final frontier in our quest for technology integration. Educational technology research and development, 53(4), 25-39.
Ertmer, P.A., & Ottenbreit-Leftwich, A.T.
2010
Teacher technology change: How knowledge, confidence, beliefs, and culture intersect. Journal of Research on Technology in Education, 423, 255-284.
Fullan, M.
2006
Leading professional learning. School Administrator, 6310, 10.
Ghamrawi, N.
2013
The relationship between the leadership styles of Lebanese public school principals and their attitudes towards ICT versus the level of ICT use by their teachers. Open Journal of Leadership, 201, 11-20.
Hills, J.E.
2009
Teachers' attitudes regarding inclusive education: Are our children being left behind? (Doctoral dissertation, Capella University).
Marsh, H.W.
2001
Distinguishing between good useful) and bad workloads on students' evaluations of teaching. American Educational Research Journal, 381, 183-212.
Mioduser, T., Nachmias. R., Tobin, D., & Forkosh, A.
2006
Pedagogic innovation combined with ICT and information technology. Tel Aviv, Ramot: Mofet Institute. (Hebrew)

Mishra, P. & Koehler, M.J.
2008
Introducing technological pedagogical content knowledge. In the Annual Meeting of the American Educational Research Association (pp. 1-16). New York, March 24-28, 2008.
Palak, D., & Walls, R.T.
2009
Teachers' beliefs and technology practices: A mixed-methods approach. Journal of Research on Technology in Education, 41(4), 417-441.
Rogers, E.M.
2003
Elements of diffusion. Diffusion of innovations (5th Ed.). New York: Free Press.
Selwyn, N.
2010
Looking beyond learning: Notes towards the critical study of educational technology. Journal of Computer Assisted Learning, 26(1), 65-73.
Shulman, L.S.
1986
Those who understand: Knowledge growth in teaching. Educational Researcher, 15(2), 4-14.
Venezky, R.L., & Davis, C. 2002. Quo vademus? The transformation of schooling in a networked world. Version 8c. OECD Centre for Educational Research and Innovation, Paris. (www. oecd. org/pdf/M00027000/M00027107. pdf).

BENCHMARKING - IMPROVING PERFORMANCE IN INDUSTRIAL SMEs

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Abstract

Purpose *- The globalization of commerce and industry requires organizations to assimilate best practices in their field. The assimilation of best practices leading to performance improvement is achieved through analysis and understanding of evidenced data gathered within, across, and outside the organization. This paper reports on the processes of benchmarking to enhance performance and competitiveness of SMEs. The purpose is to demonstrate the connections between the need to know what should be done, and how to do it, to improve the performance of the SME.*

Methodology *- A desktop study of the application of benchmarking in SMEs.*

Findings *– The paper offers a lens through which to examine the issues surrounding benchmarking in SMEs. Allocation of resources to establish meaningful benchmarks for an SME is a source of tension.*

Research limitations *– A desktop study is of academic interest, however to establish its true worth a series of benchmarking case studies in SMEs is required to support the findings.*

Practical Implications *– Benchmarking is a source of evidence-based support for the development strategic development understanding of the marketplace..*

Originality/value *- It is suggested that resources should be made available in SMEs to foster the application of such techniques for organizational and managerial improvement.*

Key words: *SMEs, benchmarking, performance*

Introduction

Benchmarking is a popular and proficient management tool used for solving critical aspects in the activity of an organization by studying and assimilating the best practices in the field and by understanding the processes that lie at their basis. As a means of continuous improvement, the popularity of benchmarking has increased and it was noticed that organizations constantly using benchmarking strategies have decreased their costs by 30 – 40% or more. This tool establishes measurement methods for each field, both regarding production units as well as costs, but it can also support budgeting, strategic planning and capital planning (Elmuti & Kathawala, 1997). Benchmarking functions as a means of performance improvement by establishing achievable goals, that have already been proved successful, and by helping outrunning the suspicion over other means of general improvement of an organization, other than the known ones (Fuller, 1997 cited in Elmuti & Kathwala, 1997). Benchmarking is a tool that requires that continuous development should be the aim of all organizations using it (Sole & Bist, 1995).

Competitor analysis and Quality function deployment (QFD) are the predecessors of present-day benchmarking (Yasin, 2002). Competitor analysis has been used for years by organizations as a means of collecting data regarding competitors' markets, sales, products, production costs, or budgets. In spite of the fact that competitor analysis is useful for assessing how a company is ranked compared to its competitors, it does not usually provide information on the methods or processes used by organizations to achieve those ranks (Fitz-enz, 1993a, cited in Yasin, 2002). Originating in Japan, QFD represents a product development approach, which allows an organization to interpret client's needs and

expectations and put them into terms of technical requirements (Kogure & Akao, 1983, cited in Yasin, 2002).

Xerox Corp., through R. Camp – who was the planning, logistics and distribution manager at the time – is credited with initiating the first benchmarking projects in 1979. Suspecting that the production cost of photocopiers was higher than in Japan, Xerox decided to gather data regarding materials, processes, and production methods. After having studied the storage operations at LLBean, a retail company selling clothes and leisure equipment – and therefore not a player in the photocopier industry, they identified the company as adequate for a comparative analysis project concerning logistics and distribution. Although LLBean products were different from those made by Xerox, frequent resemblances regarding physical characteristics, size, shape, and weight, were noticed (Tucker et al., 1987, cited in Yasin, 2002). After having visited the LLBean storage spaces and after their practices and methods having been studied, it was discovered they were superior to those used by Xerox. By using the provided data and by making the required changes, Xerox managed to decrease: (1) the quality problems by two thirds, (2) the production costs by half, (3) the product development time by two thirds, (4) the direct labour by 50% and (5) the staff by 35%, while increasing the production volume. Besides those direct outcomes, the improvement of processes and the general climate indirectly affected the rest of the organization in a positive manner (Omachonu & Ross, 1994, cited in Elmuti & Kathwala, 1997) and, above all, it led to the development of a new managerial tool named benchmarking. The Malcolm Baldrige National Quality Award was established in 1988 and it helped disseminating benchmarking positively in the USA (Spendolini, 1992a, cited in Yasin, 2002).

Another example of a successful benchmarking study is provided by car industry. Nissan/Infiniti used both functional and competitive benchmarking to establish and develop the customer service standards by following the examples set by some organizations famous for providing high quality services, such as: Walt Disney Co. (mass media, film production), McDonalds (fast food restaurants), Nordstrom (fashion), and Ritz–Carlton (luxury hotels). Infiniti studied their best HR practices, such as: liability, teamwork, expertise, and customer satisfaction. Infiniti also learnt about post-sale services from its direct competitor, Mercedes-Benz. The outcomes of those benchmarking activities were used to establish service standards and initiate Infiniti University, a training programme for customer service employees. In 1991, Infiniti ranked first in the USA regarding customer satisfaction (Walsh, 1992, cited in Yasin, 2002) as a direct result of their benchmarking activities.

Benchmarking - definition, evolution and technique classification

There are many definitions of benchmarking (there were 49 definitions identified in 2000 (Nandi & Banwet, 2000)) and they include key words such as: measurement, comparison, identification of the best practices, implementation, and improvement. One of the most quoted definitions belongs to the creator of the method, stating "benchmarking is the search for industry best practices that lead to superior performance by putting them into practice". Generally, the proposed definitions correspond to the main stages in the evolution of benchmarking, which has been constantly growing (according to the number of articles published after 2000) and has gone towards maturity (Dattakumar & Jagadeesh, 2003 cited in Anand & Kodali, 2008).

Figure 1 synthesizes the chronological perspective of the evolution of benchmarking Zairi's taxonomy of the essential types of these techniques (Moriarty & Smallman, 2008). The taxonomy of benchmarking models shows that the respective tool is of rather practical or industrial use than of academic one Anand & Kodali, 2008).

All benchmarking processes include planning/preparation, analysis, integration and action stages, use the same ground rules phrased differently and most of their methodological approaches are based on Xerox approach, which is considered to be a proficient and a generally way of running projects (Zairi & Leonard, 1994, cited in Anand & Kodali, 2008).

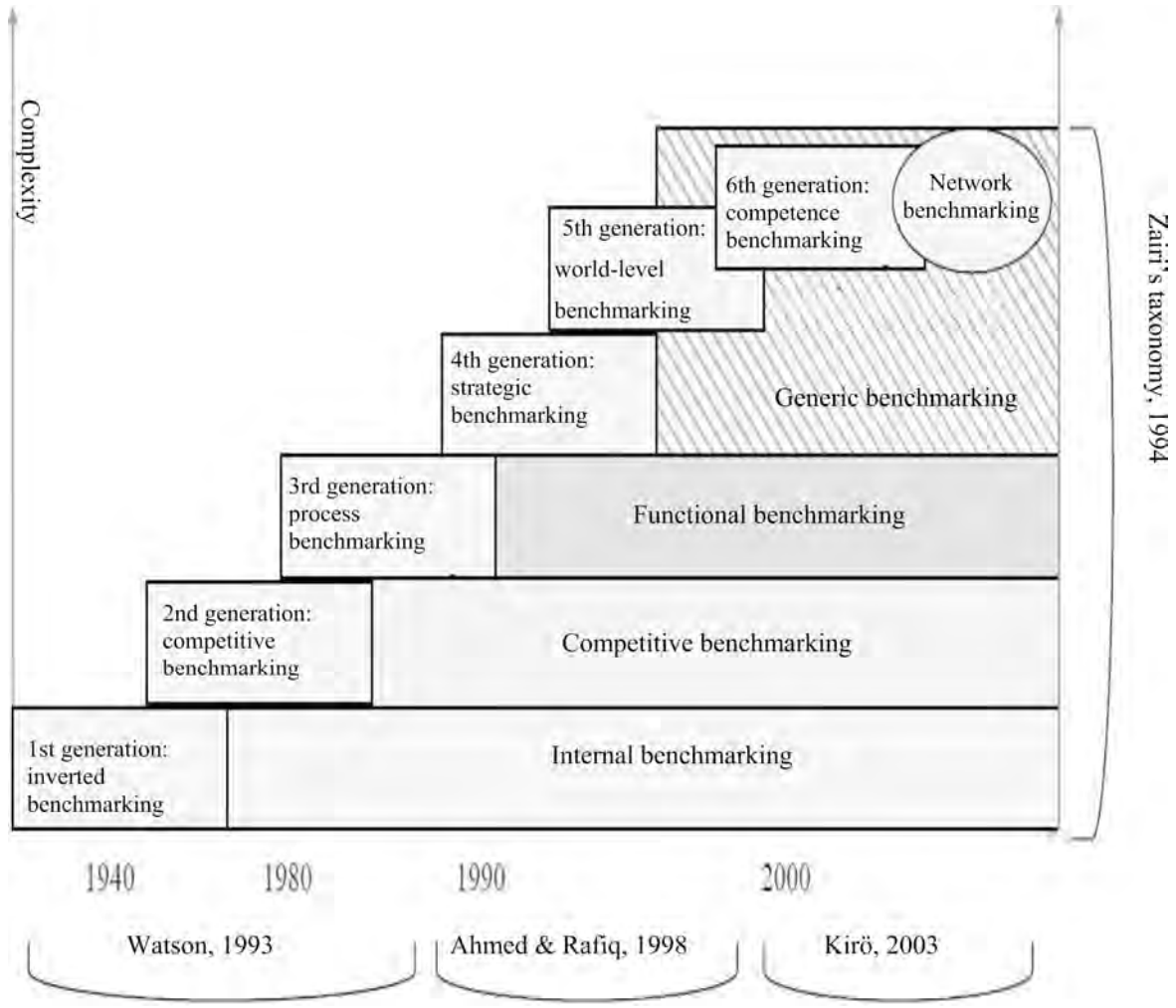

Figure 1: Benchmarking evolution

Another benchmarking classification scheme (Fong et al., 1998 cited in Anand & Kodali 2008) is presented in Table 1.

Table 1: Types of benchmarking

Classification	Type	Significance
Reference type	Internal	Comparison of the performances of the business units or of similar processes within an organization
	Competitive	Comparison with the direct competitors in order to catch up with or even to exceed their global performance
	Industry	Comparison with enterprises in the same industry, including non competitors
	Generic	Comparison with an organisation beyond industry
	Global	Comparison with an organisation abroad
Contents of benchmarking	Process	Refers to separate work processes or operation systems
	Functional	Compares specific business functions in two or more organizations
	Performance	Refers to resulted characteristics, which are measurable in terms of price, speed, reliability etc
	Strategic	Involves rather strategic assessment than operational aspects
The purpose of relationship	Competitive	Comparison in order to gain superiority on others
	Collaborative	Comparison in order to develop a learning environment and knowledge partition

Anand and Kodali (2008) identified a universal benchmarking model by applying the ABC analysis to the stages and to the best benchmarking practices, according to the occurrence percentage of each in 35 articles. The model was developed as the result of a benchmarking process applied even on some benchmarking models available in specialized literature; among which the most common one - the Xerox model. The best practices identified in the respective process were grouped in a 12-phase model (figure 2), including 54 steps (Anand & Kodali, 2008).

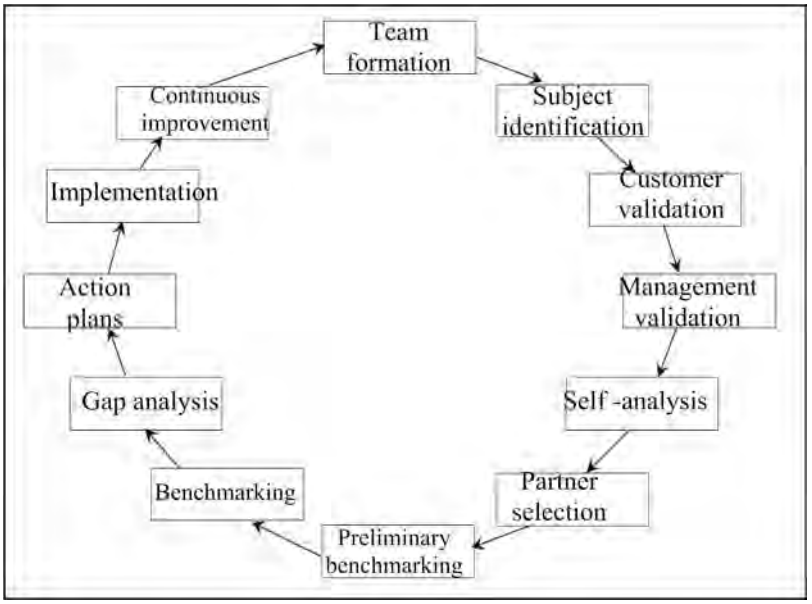

Figure 2: The 12-phase benchmarking model

To identify the problems that need to be addressed by benchmarking, Adam & Vandewater (1995) suggest using several questions that should be addressed to aid the decision process (Adam & Vandewater, 1995, cited in Cassel et al., 2001):

- What are the critical success factors of the organization (e.g. the market launching time, customer involvement, innovation etc.)?
- What processes cause the most problems?
- What processes bring the largest contribution to customer satisfaction and what processes do not meet the expectations?
- What are the competitive pressures having the greatest impact on the organization (e.g. low price, flexibility, sale conditions, product performance etc.)?
- What processes or functions have the greatest potential of differentiating an organization from its competitors?

The correlation between benchmarking and performance

Specialized literature has pointed out the existence of a connection between benchmarking and performance, but to the authors' knowledge it has not been tested experimentally. Voss, Ahlstrom & Blackmon (1997) intended to test the following hypotheses:

1. Operational performance is positively correlated to benchmarking.
2. Business performance is positively correlated to benchmarking.
3. Over-optimism is negatively correlated to benchmarking.
4. Over-optimism is negatively correlated to operational performance.
5. Learning-orientation is positively correlated to benchmarking.

The premise is that the model of company competitive skills is based on 6 critical areas of the production process: logistics, production systems, lean production, competitive engineering, and quality (figure 3). The findings of the regression analysis show that the use of benchmarking is strongly connected both

to operational performance and to business performance, therefore supporting the statements in the management literature regarding the benefits of benchmarking. Besides this direct connection, the existence of an indirect connection between benchmarking and performance (Voss, Ahlstrom & Blackmon,1997) was also proven.

- The companies which over-estimate their competitiveness are subject to delays in adopting improvement programmes and, therefore, they can be surpassed by their competitors;
- The companies with realistic estimations will increase their chances of identifying the areas where improvement has the strongest competitive impact.

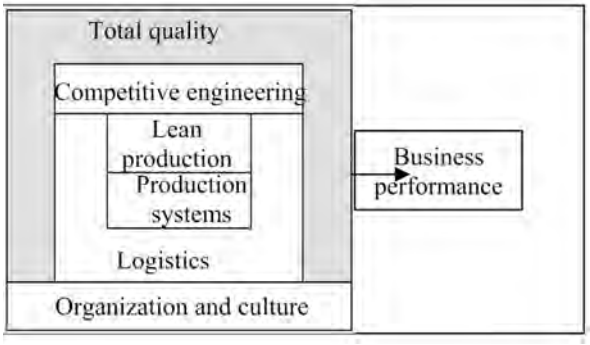

Figure 3: The critical areas of the production process

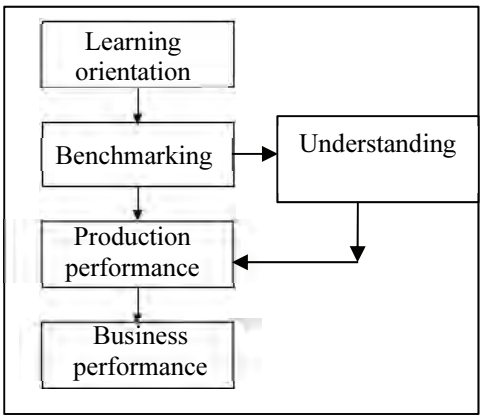

Figure 4: The connection between learning, benchmarking, understanding and performance

Learning orientation was also correlated to benchmarking, supporting both the “knowledge factory” concept and the “learning organization” concept. Based on these findings, a connection between learning, benchmarking, understanding, and performance was proposed, as presented in figure 4.

In conclusion, benchmarking:

- Is a vital tool for a learning organization and it is used for improving performance. Learning organizations are more likely to use benchmarking than other organizations.
- Promotes high performance directly, by helping companies identify the best practices and establish challenging performance targets.
- Increases understanding of the strong and weak points of a company compared to its competitors’.
- Can be a proficient tool for planning and applying the changing processes that lead to organization improvement.
- Has its own place in today’s business, especially when used together with total quality management and ongoing quality improvement.

Benchmarking has an internal dimension, through which an organization assesses itself critically in order to identify its best practices, and an external dimension, through which an organization looks for guidelines and competitive practices in its field, or in other fields, in order to implement them (Yasin, 2002). Depending on the envisaged objectives, the required effort and the risks taken, there are four levels of benchmarking (Sole & Bist, 1995):

1. Improvement of the organization situation
2. Equalizing the competitors
3. Exceeding the competitors
4. Becoming the best in the world.

In spite of the increasing occurrence in the number of benchmarking activities and of the organizations using it, benchmarking still remains slightly underused at system level and it lacks the unifying theory which to guide its progress (Yasin, 2002).

The use of benchmarking in SMEs

SMEs have limited financial, technical, organizational and human resources. They also tend to dedicate the most part of their effort to technological aspects concomitantly with neglecting organizational and managerial problems (Garengo et al., 2005). Regarding the use of benchmarking in SMEs, there is a long tradition of Japanese SMEs following the pattern of practices used by large enterprises (Cassell, Nadin & Older Gray, 2002). Besides, many studies assume that large enterprise practice can be downscaled and applied to SMEs (Ghobadian & Gallear, 1997 cited in McAdam & Kelly, 2001). But, there are researchers who consider that SMEs are not simply smaller versions of their larger counterparts (Klewitz, Zeyen & Hansen, 2012) and that benchmarking has less to offer to SMEs, as it relates to the standards of larger enterprises. Research has confirmed underperformance of SMEs regarding a variety of current practices used in large organizations, such as: TQM, stress management, Just in Time, information manipulation, and has stressed the necessity of questioning the adequacy of solutions provided by large enterprises. Van de Wiele and Brown (1998) suggest that small enterprises are less preoccupied by initiatives in quality than large ones, but they feel more comfortable with formal approaches. Research showing the best practices for the SMEs is necessary to offer benchmarking appropriate to SMEs context standards. Limited resources and the poor organization in the SMEs' field stress the necessity of profitable and proficient benchmarking systems (Cassell, Nadin & Older Gray, 2002).

Specialized literature shows lack of an adequate and relevant benchmarking framework that can be utilized by SMEs. Such a framework must:

- Be systematic and easily understandable;
- Be structurally simple;
- Have clear connections between the presented elements or steps;
- Be general enough as to be suited to different contexts;
- Present an operating instructions form and the planning tools necessary to the implementation process;
- Offer answers to "how to?" questions, not to "what is?" ones;
- Be implemented at a reasonable cost and in a reasonable length of time.

In order that the positive results in the first steps provide the necessary motivation and the pulling force to go on, and because of the limited resources, SMEs should start benchmarking approaching the "tangible" parameters rather than the "intangible" ones, which are difficult to quantify (Deros et al., 2006 cited in Klewitz, Zeyen & Hansen, 2012).

Paradoxically, although SMEs have higher potential of benefitting from benchmarking than large enterprises, most of the times, the necessary techniques are unknown, inaccessible or at least, perceived as such (Monkhouse, 1995).

Considering the characteristics of the SMEs, P. Garengo et al. (2005) focus on synthetic benchmarking, considering it to be the adequate benchmarking tool for SMEs. Synthetic benchmarking focuses mainly on practices, not on performance, and it appeared in order to develop an approach that stimulated the improvement of management systems and organizations. Performance oriented benchmarking systems focus on collecting quantitative information (measurement) which, when "comparison" is targeted, emphasizes the disparities between the reference level and the envisaged performance. As a result, the necessity of making improvements is identified, but not the way of doing that. But, as far as SMEs are concerned, the processes behind performance need to be analyzed in order to understand what improvements need to be done and how. Benchmarking regarding practices is different because it forces an organization to understand not only its own practices, but also the targeted practices and the process of comparing them. Besides, defining the gaps between the current and the targeted practices does not only emphasize the need for improvement, but it also suggests the way in which these improvements should be made and it develops a learning process. Thus, practice analysis is the engine of change

(Garengo et al., 2005). According to some researchers, a benchmarking practice database can be a powerful instrument for a SME cluster (Carpinetti & Oiko, 2007).

As a result of an inquiry regarding the benchmarking studies made by SMEs in Great Britain, there resulted the findings in table 2.

Table 2: The use and effectiveness of some benchmarking indicators in SMEs (Cassell, Nadin & Older Gray, 2002).

Benchmarking indicator (BI)	% of enterprises using BI	% of enterprises finding BI proficient	% of enterprises which would find BI useful
Financial performance	42	74	34
Customer satisfaction	40	95	40
Product/Service quality	39	92	34
Marketing data	31	81	38
Employee training	31	87	36
Product innovation	26	85	19
Communication within company	24	96	38
Workplace satisfaction	22	86	35
Attitudes towards satisfaction	21	90	43
Innovation process	21	86	32
Team spirit	19	89	41
Stress level	10	90	27
Other	2	-	10
None of the above	37	-	31

The following conclusions that can be drawn from these findings are:

- 37% of the interviewed enterprises did not use any data resulted from benchmarking; regarding the 63% of the enterprises which used benchmarking, indicators such as: financial performance (42%), client satisfaction (40%) and product/service quality (39%) aroused the highest interest;
- Although financial performance is the most frequently used indicator, it registers the lowest percentage (74%) when it refers to proficiency;
- Regarding the expected use, the attitude towards quality (43%), the team spirit (41%) and the customer satisfaction (40%) are the most popular 3 indicators and are characterized as “soft”;
- Financial performance (42%), customer satisfaction (42%) and quality being the most frequently used indicators in benchmarking can be explained by the fact that these SMEs function in an extremely competitive environment;
- The findings confirm previous studies which suggest that enterprises are interested in rather “hard” benchmarking topics, such as financial performance, than in “soft” topics, such as customer satisfaction;
- Using a form of benchmarking was done mainly informally and was focused on external performance criteria, such as: profitability, market share, quality and customer service. None of the inquired enterprises had systematic benchmarking procedures;
- The enterprises which had not used benchmarking argued that lack of time and resources were the main causes;
- Some respondents considered benchmarking could be useful, some - were skeptical or disregarded its importance, and others – doubted the logic of using the performance of other companies in order to assess your own company;
- Almost a third (31%) of the enterprises in the sample did not find any indicator effective and they are probably uninterested in approaching benchmarking. According to the data, the main causes of these are: the usual financial drawbacks suffered by the SMEs and the fact that managers cannot be convinced that benchmarking in SMEs is feasible and has potential, since its best practices come from large enterprises. As far as considering the lack of resources as the cause of not conducting benchmarking surveys, other researchers consider that, if SMEs managers were convinced of the strategic importance of benchmarking, they could find the resources necessary to conduct such surveys, but the real causes of not using benchmarking might be different (Monkhouse, 1995). A study shows that the main reason for not using benchmarking

is the lack of understanding the technique. Another study shows that the main drawbacks in using competitive benchmarking more intensely in SMEs are the ones presented in figure 5.

The perception that benchmarking is a useful exercise for SMEs is certainly growing, but waiting for the best practices coming from large companies is no longer a practical option (Monkhouse, 1995).

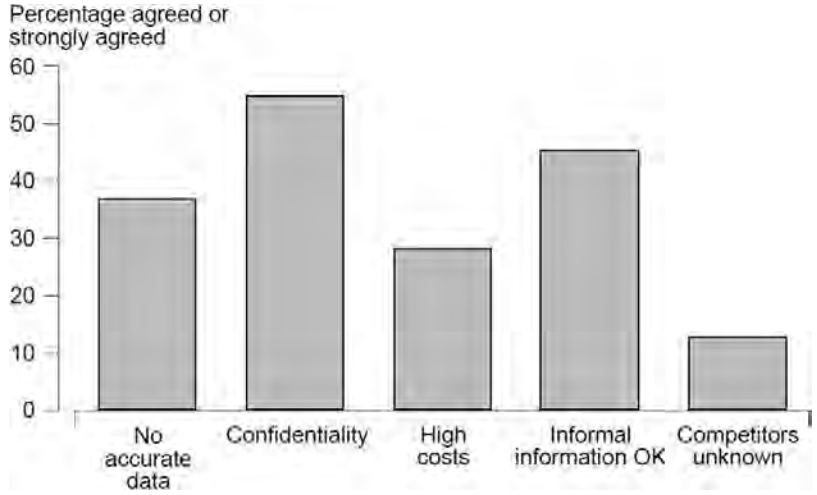

Figure 5: Drawbacks in using competitive benchmarking more intensely in SMEs

Discussion and conclusions

Benchmarking is a popular and effective management tool for resolving certain critical aspects of an organization's activity through studying and assimilating the best practices in the field and understanding the underlying processes. That implies that continuous improvement is the goal of all the organizations that use it. Despite the growing incidence of benchmarking activities and the number of organizations using it, benchmarking remains largely without a system-wide approach and without a unifying theory to guide its use, and progress. For this reason even though, paradoxically, SMEs have a greater potential to benefit from benchmarking compared to large companies, often the necessary techniques are unknown or inaccessible or, at least, perceived as such. In addition, SMEs have limited financial, technical, organizational, and human resources and, even more, tend to devote most of their efforts to the technological issues while neglecting the organizational and managerial ones.

References

Adam, P. and R. Vandewater
1995
"Benchmarking and the bottom line: translating business re-engineering in to bottom-line results", Industrial Engineering, Vol 27 No. 2, 24
Anand, G., and R. Kodali
2008
"Benchmarking the benchmarking models", Benchmarking: An International Journal, Vol. 15 No. 3, 2008, pp. 257-291
Carpinetti L. C. R., and O.T. Oiko
2007
"Benchmarking in clusters of SMEs: development and application of a data base", Paper presented at the 19th International Conference on Production Research
Cassell C., S. Nadin, and M. Older Gray
2002
"The use and effectiveness of benchmarking in SMEs", Benchmarking: An International Journal, Vol. 9 No. 1, pp. 7-27
Elmuti, D.and Y. Kathawala
1997
"An overview of benchmarking process: a tool for continuous improvement and competitive advantage", Benchmarking for Quality Management & Technology, 01/1997, Volume 4, Issue 4

Fitz-enz, J.
1992
Value-added benchmarking: a tool for getting precisely what you want, Employment Relations Today, Vol. 19 No. 3, pp. 259-64.
Fong, S.W., E.W.L. Cheng, and D.C.K. Ho
1998
Benchmarking: a general reading for management practitioners, Management Decision, Vol. 36 No. 6, pp. 407-418
Fuller, S.
1997
"Tools for quality", http://www.abo.fi/~sfuller/AbVan593.html, (April 15).
Garengo P., S. Biazzo, A. Simonetti, and G. Bernardi
2005
"Benchmarking on managerial practices: a tool for SMEs", The TQM Magazine, Volume 17 No 5, pp. 440-455
Klewitz, J., A. Zeyen, and E.G. Hansen
2012
"Intermediaries driving eco-innovation in SMEs: a qualitative investigation", European journal of innovation management, 2012, Volume 15, Issue 4
Kogure, M. and Y. Akao
1983
"Quality function deployment and CWQC in Japan", Quality Progress, Vol. 16 No. 10, pp. 25-9.
McAdam R, and M. Kelly
2001
"A business excellence approach to generic benchmarking in SMEs", Benchmarking: An International Journal, Vol. 8 No. 3, 2001, pp. 212-222
Monkhouse, E.
1995
"The role of competitive benchmarking in small to medium-sized enterprises", Benchmarking for Quality Management & Technology, Vol. 2 No. 4, pp. 41-50.
Moriarty, J.P., and C. Smallman
2008
"En route to a theory of benchmarking", Benchmarking: An International Journal, Vol. 15 No. 3, pp. 257-291
Nandi, S.N. and D.K. Banwet
2000
Benchmarking for world-class manufacturing – concept,framework and applications, Productivity, Vol. 41 No. 2, pp. 189-200.
Omachonu, V.K. and J.R. Ross
1994
Principles of Total Quality, St. Lucie Press, Delray Beach,FL, pp. 137-54.
Sole T.D.,and G.Bist
1995
"Benchmarking in Technical Information", IEEE Transactions On Professional Communication, Vol. 38, No. 2
Spendolini, M.J.
1992a
The Benchmarking Book, AMACOM, New York, NY.
Tucker, F.G., S.M. Zivan, and R.C. Camp
1987
"How to measure yourself against the best", Harvard Business Review, Vol. 87, No. 1, pp.2-4
Van der Wiele, T., and A. Brown
1998
"Venturing down the TOM path for SMEs", International Small Business Journal: Researching Entrepreneurship, Vol 16, No. 2, pp.50-68
Voss, C.A., Ahlstrom, P. & Blackmon, K.
1997
"Benchmarking and operational performance: some empirical results", International Journal of Operations & Production Management, Volume 17, Issue 10, 1046-1058.

Yasin, M. M.
2002
"The theory and practice of benchmarking: then and now", Benchmarking: An International Journal, Volume 9, Issue 3, pp.217-243
Walsh, J.
1992
"The pursuit of a benchmark: how Nissan/Infiniti developed its service standard", Multinational Business, No. 4, pp.19-26.
Zairi, M., and P. Leonard
1994
Practical Benchmarking: The complete Guide, Chapman & Hall, London

THE EVOLUTION OF ONLINE COMMERCE ON THE INTERNAL AND INTERNATIONAL MARKET

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Abstract

Purpose *In the market economy, the goal of any manager or entrepreneur is to develop a profitable business. The number and development of economic agents depends on the development of a country's economy. Supporting and encouraging business development, ensuring growth in the economy, in the last few years one can say that the development of online commerce has also gained momentum at national level.*

Methodology/approach *If we try to define the economy on the internet, we could say that it is all that brings profit, and yet, as seen in America, the net-economy becomes also for Romania the Future. E-commerce offers the opportunity to gain more customers and communicate with them more closely.*

Findings *According to studies, online commerce is growing at an alert pace, knowing that Asia currently owns 50% of the world's ecommerce market, being one of the findings of the Global Ecommerce Report of 2017, which shows trends and perspectives on different regions of the global e-commerce industry.*

Research limitations/implications *The presented research problem is an analysis of the situation of the global evolution of electronic commerce and the tendencies of development and seizure of the Romanian markets.*

Practical implications *Entering into different markets, developing and maintaining a profitable society requires a performance management achieved by efficiency and effectiveness, from a theoretical point of view. In practice, the two terms must be combined and balanced to get a performance management.*

Originality/value *Starting and developing an online business seems to be one of the simplest business that can be set up and it seems to cost much less, and yet the development of an online business is not as simple as any other business, the risks exist as with the other types of business.*

Key words: *e-commerce, management, performance, economy, market*

Introduction

The first attempts and steps in creating the Internet idea were made in 1957 during the Cold War, when the Soviet Union managed to launch the first satellite named Sputnik in Earth's orbit. As a reaction to this and the fear of a missile attack, the US government decided to set up the Advanced Defense Research Agency to share information about military defense research projects.

In 1966, this agency, under the guidance of scientist Larry G. Roberts, set up the first computer network called ARPANET. In parallel with this approach, another concept of a military computer network was launched and was made by the American company RAND. In a totally different area over the ocean in the UK, a computer network of commercial destination was launched by the National Physics Laboratory (NPL). Furthermore, the last concept of a science-based network belongs to the French Institute of Computer Science and Automation (CYCLADES).

These four concepts are the pillars that underpin the creation of the Internet. In the years 1972-1973, Vint Cerf, computer scientist and researcher, together with computer scientist Bob Kahn, invented the

Transmission Control Protocol (TCP) protocol. This protocol controls data transmission and moves them to the new Internet. They also created and developed the IP prototype. If we were to say that two people "invented the Internet" they would be Kahn and Cerf.

In 1990 Tim Berners-Lee, an English engineer and computer scientist, invented the World Wide Web together with Robert Cailliau, an engineer. The World Wide Web is part of the Internet, a vast network of Internet-based information that includes text, pictures, sounds and moving images. Berners-Lee has developed both the first web browser that allows the user quick and easy access to information provided by Web pages as well as the HTML language that forms the basis for Web page creation and the HTTP protocol used to request and transmit web pages between servers and browsers.

If we want to define the Internet, we can say that it is a super-network of computer networks around the world, in a continuous development that radically changes the way of communication in the contemporary world. We can say that it is a huge library, a fast mailing tool, a new publishing medium and a means of worldwide information dissemination. It is a brilliant invention this way of electronic communication: simple, interactive. Nowadays, it does not matter whether you are in a distant locality or in a metropolis, the access being equal to the same sources of information.

When we are connecting to the Internet, our computer becomes an extension of what appears as a giant computer, a computer with branches all over the world. In fact, our computer "communicates" simultaneously with another computer or millions of computers in the world. Tens of thousands of networks everywhere on Earth are interconnected, exchanging information with each other; hundreds of millions of people use this system every day.

Nowadays, trading companies everywhere promote their products and services using the Internet. Using webpages and websites or mobile apps, they create real exhibitions for sale or ordering products. Customers will quickly find out the technical features of the products, the services they offer, the prices, the quality and the payment methods. The evolution of Internet commerce has led to web pages replacing catalogs of products / services, providing all the necessary information. They can also take over the customer's orders regardless of the time of day when they take place. The Internet is not only a way used by business companies and individuals to advertise on the Internet by offering their services. Doctors, lawyers, painters, plumbers find people interested in their services through the Internet.

The moment of Internet commerce has attracted a multitude of positive effects:

- The communication and work process has been substantially simplified in terms of management and administration, the documents being easily archived, communication being much more efficient, eliminating a number of ineffective intermediaries;
- Automatically reduce communication costs, but also those related to manipulation of information and data;
- Developing and facilitating teamwork in distributed environments or locations, teamwork being substantially easy to be done;
- There are now established world-wide connections, using global technology, also the communication framework is widening, the borders of businesses, universities, cities, the region, the state no longer exist. Anyone can communicate with the world, Extending marketing and communication action on a planetary scale.

As a result of this, resources and money began to move towards this area, which has seen substantial growth. The timely connection of an increasing number of people has led to increased profitability of trade, thus emerging economics over the Internet.

Jeff Bezos, the creator of the Amazon phenomenon, said: "In the old world, the idea was to spend 30% of your time, energy and your efforts to improve customer satisfaction and 70% of time, energy and efforts to shouting about it. Online is the reverse. You have to invest 70% in customer satisfaction and 30% to get to know what you've done. " Ecommerce offers the opportunity to win more customers and to make better communication with them, to better understand their preferences. Studies conducted by the United States Department of Commerce in 2008, which is known to have been a year dominated by the economic crisis, highlighted the fact that electronic commerce increased by 4.6% over 2007, with sales of 133.6 billion dollars.

Market and competition

The market plays an important role in the functioning of an economy. Market is the place where demand and supply meet, furthermore is where we find economic agents and their decisions. Of particular importance is the competition among manufacturers that have to take a multitude of decisions about reducing manufacturing costs, research in the field, renewing and increasing product quality in order to maximize profit. The online market appeared and developed in the United States in 1995-1996 when the first forms of online commerce emerged by the creation of the eBay platform by an Iranian origin programmer and whose first uses were to make online auctions. Subsequently, the company received $ 5 million from Benchmark Capital, and then saw a real edge. In 2002, the company acquired the PayPal online payment system, and in 2005 acquired the Skype Internet Telephony System. In present, has subsidiaries in more than 35 countries, being in a continuous expansion.

Another form of online commerce, Amazon, did not get too much credit in 1996 when it held about 10 employees in the books online commerce in comparison with the Barnes & Noble bookstores. Subsequently, Jeff Bezos, the creator of Amazon, developed the business, with Barnes & Noble no longer having the chance to develop an online commerce business like Amazon did. The creator of the Amazon phenomenon, declared in Business Week in 1999: "We want to be the most customer-oriented enterprise of all industries in all ages."

The phenomenon was featured on the front page of newspapers, studied in economics, and the bookstore became a symbol of America success stories, as is McDonald's. With such reputation, Amazon has managed to create a multitude of distribution networks in several countries of the world (Canada, Mexic, China, India, Germany, UK, Japan etc.). Amazon has also created software development centers in America, Asia, Africa and Europe. Among the European countries in which these centers are located there is also Romania.

Over time, the Amazon platform evolves, conquering sector by sector, with the pure marketing principles, willing to offer to its customers the best world service available, gaining customers' loyalty, with the chances of being the first business generating more than 1000 bilions US dollars, according to Barclays. It is known that at the moment, Amazon is considered the world champion in the Research&Development investments.

One of the many Amazon Fulfillment centers - Source:Business Hi-Tech

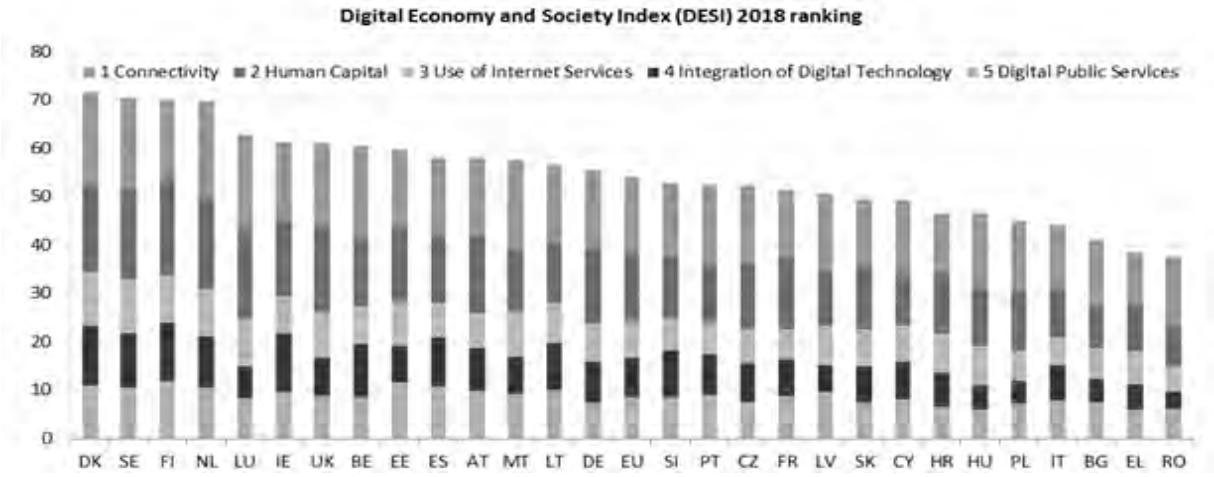
In 1956 in the United States of America, the first mall complex was erected. Mall constructions had their highest peak in 2005, being built around 1,500 shopping malls. From 2006 to the present, mall construction stopped and not only that they were not built anymore, but during the period 2010-2013 the visits to the city malls have fallen by 50% and now a good part of them were closed due to the closure of a large number of stores.

Amazon is currently working to create logistics centers, called fulfillment centers to develop and create new jobs, which is why it plans to buy decommissioned malls, all of this are achieved by Amazon opening up to external third-party sellers, who can sell their products online via Amazon's FBA program, that is Fulfillment By Amazon.

Source: Business International

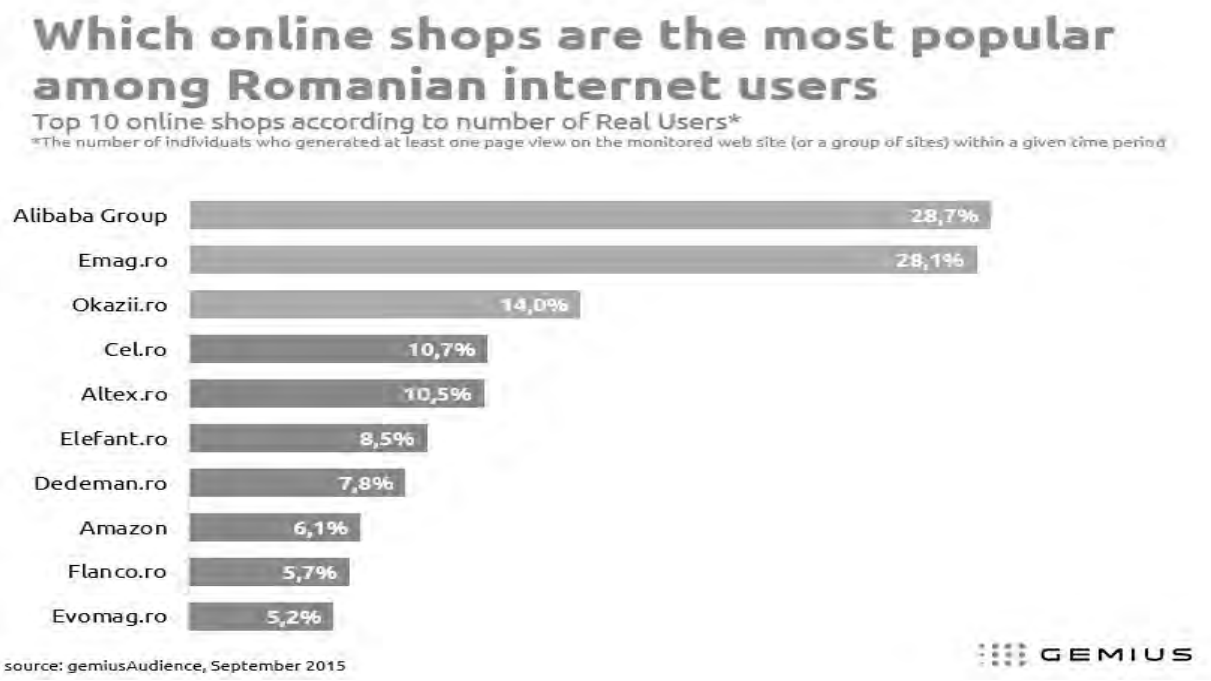
Although in our country online sales and online shopping exists and is used, the process is still quite moderate. Nowadays in Romania the most common way of paying the products purchased online is the repayment, which gives the buyer the certainty that he cannot lose anything and that the buyer only pay when it gets physically the good purchased online. According to studies in Romania, the most frequent online transactions are those related to the purchase of air travel vouchers, tourist tickets and software products.

Romanian market follows the global increasing trend in online sales, therefore purchasing through online channels has increased in recent years in Romania too according to the conclusion of the Digital Economy and Society Index (DESI) for 2018 published by the European Commission.

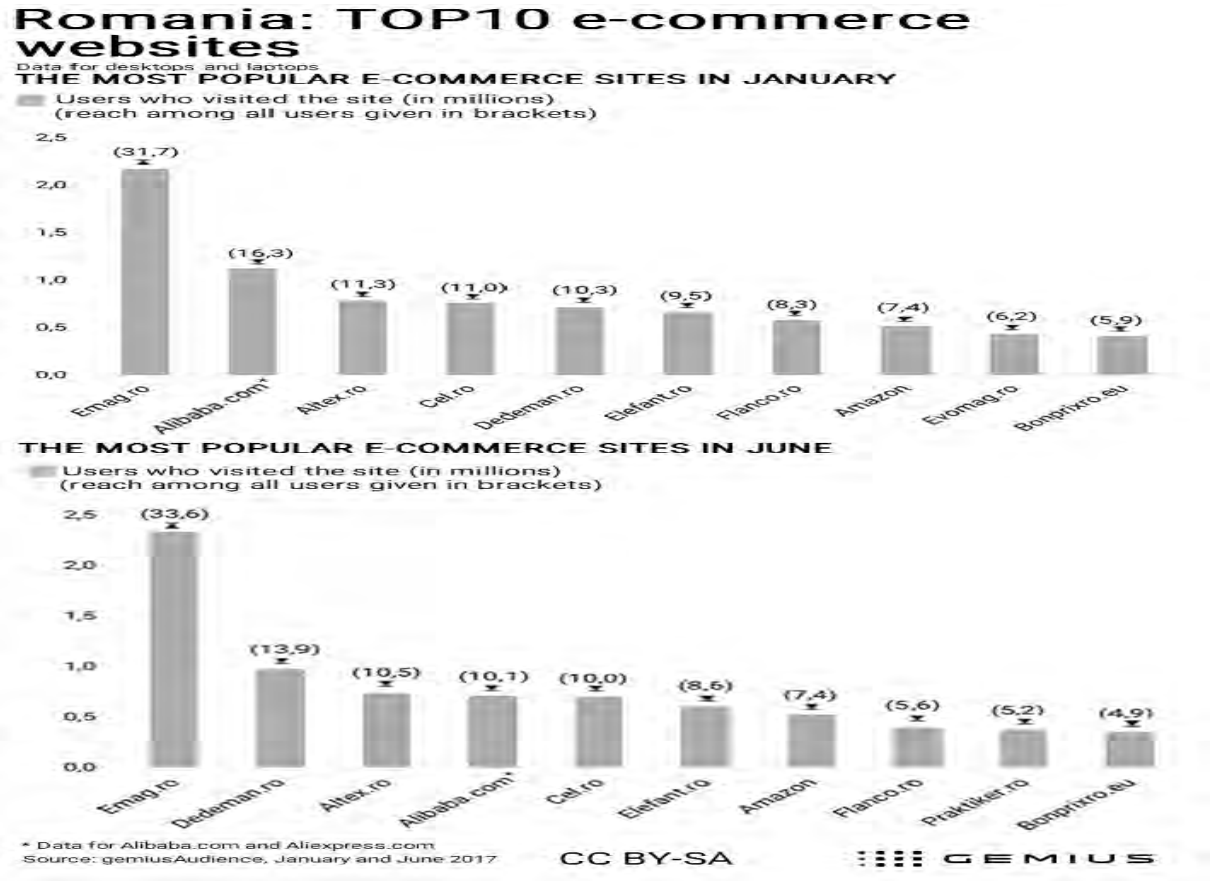


Source: The Digital Economy and Society Index (DESI) DESI 2018

Although there are also domestic companies doing online sales, however, according to studies, the most visited site in 2015 were that of the Chinese group Alibaba.com. Among the Romanian companies that have a strong online commerce the second place is the well know retailer Emag.ro, followed by the oldest Okazii.ro online trading site.



Another study conducted in 2017 shows us that Emag had a real growth in sales volume in Romania, moving in the top position of the Gemius Audience ranking.



Conclusions

Online business has emerged since 1970 in economically developed countries, becoming an important factor in the development, growth and prosperity of society.

The growth and development over time of online commerce has brought a number of positive and negative effects such as:

- The substantial expansion of markets for products and goods increases the possibility for the sellers to present their products on several markets, but this also brings with it an increase in competition that requires an increase in the quality of the products with implications for the price;
- Business costs are significantly reduced via online businesses mainly due to the reduction of transaction costs by removing the intermediators;
- Improving and perfecting the business through the online products description capability and increasing the dynamics of the business.

For sure developing an online business faces challenges in less developed countries with the consumer reluctance to invest in products that cannot be physically seen and tested, the mistrust of how to deal with a merchant with no direct physical presence.

On the other hand, access to e-commerce can be done today through a wide range of technologies such as: computers, laptops, smartphones, tablets, with less effort and time invested for a purchase, with no geographic limitations and with online payment.

References

Afuah, A.
2003
Internet Business Models and Strategies, McGraw Hill,
Barefoot, C.
2004
Revoluţia comerţului electronic, Editura Amaltea
Burlacu, S.V., Candin C.
2010
Comert electronic, Editura Alma Mater, Sibiu
Roșca, I.Gh., Ghilic-Micu, B., Stoica, M.
2006
Informatica, Societatea Informațională, e Serviciile, Editura Economică, București
Roșca, I. Gh.,
2004
Comerțul electronic, Editura Economică, București
Kovács, L.A.
2002
Comerţ Electronic, Presa Universitară Clujeană, Cluj-Napoca, 189 pp., ISBN 973-610-087-1.
Mircea, A.T.
"Study upon Applying Multi-Criteria Analysis to the Selection of Building Materials", The 28th IBIMA Conference "Vision 2020: Innovation Management, Development Sustainability, and Competitive Economic Growth", Seville, Spain, 2016.

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COULD BE PERFORMANCE MANAGEMENT A SOLUTION FOR AN ECONOMIC RECOVERY OF THE DEINDUSTRIALIZED AREA

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Abstract

Purpose *– We have proposed that, by focusing our case study on a county where the percentage of depopulation and deindustrialization has alarming proportions, to identify a package of measures available to decision stake holders of the county and of national level to prevent the further deterioration of the existing situation.*

Methodology/approach *- We used the questionnaire as a technique for investigating the territorial administrative units in Hunedoara County regarding the IT level, as well as the stage of the implementation of the Inspire directive regarding the spatial data. Two questionnaires we were used, the first focused on the level of IT, consisting of 25 questions, and the second focused on the establishment of the national spatial information infrastructure composed of 20 questions.*

Findings *– Based on the processing of the data gathered through the questionnaires and on the statistical data existing at national and county level, we identified some trends in employability, education and IT, trends that led us to a set of measures that we will propose to the decision-makers at county and national level.*

Research limitations/implications *– Even data were collected from the 66 TAU's (Territorial Administrative Units - 14 cities and municipalities and 55 village) from the whole 69, we will present the data representing 11 cities.*

Practical implications *– Considering that depopulation and deindustrialization of Hunedoara County is about 30% over the last 25 years, it is obvious the existence of a major problem regarding the future of the county. Using the experience of over 25 years of authors in the field of education and IT, we aim to find solutions at least in these areas of competence, solutions that will compete to stop the decline and start the economic recovery of the county.*

Originality/value *– Solutions for the economic recovery of the Hunedoara County where depopulation and deindustrialization are fundamental problems can come only from performance management, where decisions are based on a profound analysis of the current situation, but also on a modern managerial vision in which education and IT are fundamental pillars.*

Key words: *Deindustrialization, IT, GIS, Education, Managerial decisions*

1. Introduction

Deindustrialization and depopulation – a great challenge for the Romanian economy

Romania will probably have a period of deep socio-economic transformation over the next three decades. The population will fall below the level existing in 1950 about 15 million people. Extremely strong urbanization from the 1950-1990 period, respectively 330%, has a 15% decline only in the period 1990-2010, and this decline continues sharply, despite the forming of 4 major Romanian conurbations. Also another main socio-economic transformation will be the strong deindustrialization.

Deindustrialization is a devastating process; such a phenomenon has affected Detroit in 1965-1970. Detroit reached its population peak in the 1950 census at over 1.8 million people, and decreased in population with each subsequent census; as of the 2010 census, the city has just over 700,000

residents, adding up to a total loss of 61% of the population. The city now has 80,000 abandoned or abandoned buildings and only 275,000 working people. (Seelye, 2011)

But a demographic decline of such a magnitude has never been recorded over two decades, covering an entire region, as in the case of Eastern Europe in the past 25 years, according to a broad analysis published by the Financial Times. https://ro.sputnik.md/society/20160815/8592007.html

In all states from the former Soviet Union, the share of industry in the structure of the employed population was considerably higher than in the capitalist countries, for rather ideological reasons, which were based on the particular communist model of development. Romania is ranked first in this respect, followed by Ukraine, Poland, Russia and Hungary. Our country therefore had a comparatively greater burden on industrialization, also accentuated by the fact that in the last decade, marked by the "debt payment", this industry had been stepped up by investment and refurbishment. However, Romania also had a very large share of the employed population in agriculture, even in permanently decreasing (from 51.2% in 1969 to 27.9% in 1989). (Zalewska, 2006)

What happened under these conditions? In the first decade of the "transition to a market economy" the employed population in industry declined from 37.5% to 22% and that of the employed population in agriculture increased from 27.9% to 42%, the increases in services are virtually insignificant. But deindustrialization is not only an economic phenomenon, but also a social one. Even from this point of view, things are not better, but few talk seriously about the costs and social implications of the restructuring of the economy. In recent years, the population of the top 100 localities in Romania has decreased by about 16%, from 9.6 million in 2002 to 8.1 million inhabitants in 2011, according to data centralized by Financial Newspaper based on censuses carried out by the National Institute of Statistics (INS). - Data is reported for 2011, because then we have the last census. http://www.zf.ro/analiza/cum-a-sters-dezindustrializarea-orase-intregi-din-romania-disparitia-colosilor-din-bucovina-si-moldova-10061819

A United Nation report published in 201, about the demographic rate of Romania shows that by 2050, the number of Romanian citizens will be reduced from 19 million inhabitants, that Romania has currently up to 14.5 million. https://ro.sputnik.md/Moldova_Romania/20160420/8491315.html

Moldova is by far the most affected by the phenomenon of deindustrialization, cities like Vaslui, Barlad, Roman, Galaţi, Dorohoi, Piatra Neamţ and Onesti have lost more than 25% of the population after 2000! But in the first 15 cities with the highest depopulation we find 4 cities in Hunedoara County - Lupeni, Petrosani, Vulcan and Hunedoara, being the only cities outside of Moldova in this sad ranking. According to the 2011 census, the number of inhabitants of Hunedoara County has fallen below 400,000 and is approaching that of 1956, before massive industrialization. In the county, around 120,000 jobs have been lost as a result of restructuring in mining and ironmongery. http://hunedoaralibera.ro/judetul-hunedoara-se-depopuleaza-ritm-accentuat/ (Rusu, 2016), (Boscoianu, 2016)

2. Trends in employability and education in Hunedoara County

The employment rate in Hunedoare and in Romania are almost the same, above 40 percent of the whole population, only the pensioner rate is a bit higher 25 percent in Hunedoara, than the 21 percent in Romania. (see table 1)

Table 1. Employment level in Romania and Hunedoara County in 2011

POPULATION / TYPE	EMPLOYED POPULATION	UNEMPLOYED POPULATION	STUDENTS	PENSIONER	HOUSEHOLD	MAINTAININED
ROMANIA	8.507.759	672.578	2.990.441	4.268.347	1.185.676	2.047.891
HUNEDOARA	173.577	16.919	57.390	104.331	22.596	37.477

Source: National Institute of Statistics Census 2011

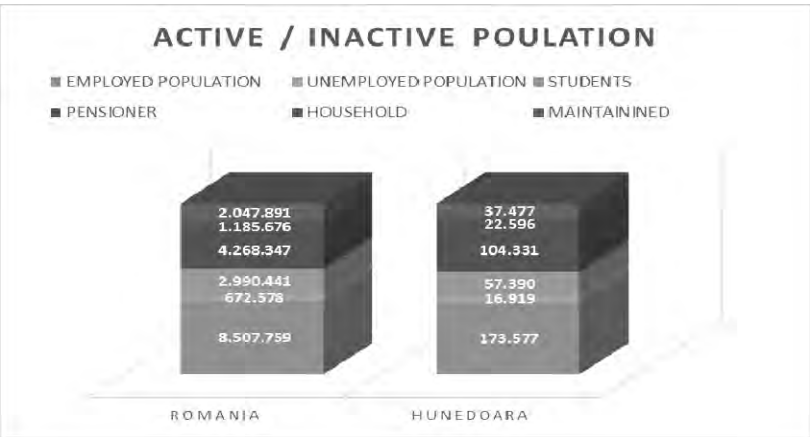

Figure 1 Employment level in Romania and Hunedoara County in 2011

Source: National Institute of Statistics Census 2011 - adapted

The urban working force represent 71 percent of the whole working force for Hunedoara, and 51 percent for Romania, so we can understand why the des industrialization will affect in a more significant measure Hunedoara county. (122.379 from 173.575) (see table 2)

We can conclude: **excessive concentration on the urban working force in Hunedoara, so des industrialization will affect in a more significant measure Hunedoara county.**

Table 2. Urban working force type in Romania and Hunedoara County in 2011

Working Force Type	Total	Senior officials	Specialists	Technicians	Administrative officials	Service workers	Workers in agriculture	Qualified workers	Machines operators	Unqualified workers
ROMANIA	4.653.439	188.798	1.093.812	579.434	274.953	816.359	185.311	740.266	451.698	322.808
HUNEDOARA	122.379	3.992	20.894	12.741	7.840	18.980	5.505	27.963	14.288	10.176

If we take a look over the urban working force type in figure 2, we can see two significant differences in Hunedoara beside Romania: there is a lack of specialists - 7% lower and an “excess” of qualified workers + 7%.

We can conclude: **we must qualify the working force in Hunedoara to counterbalance the deficit of specialists.**

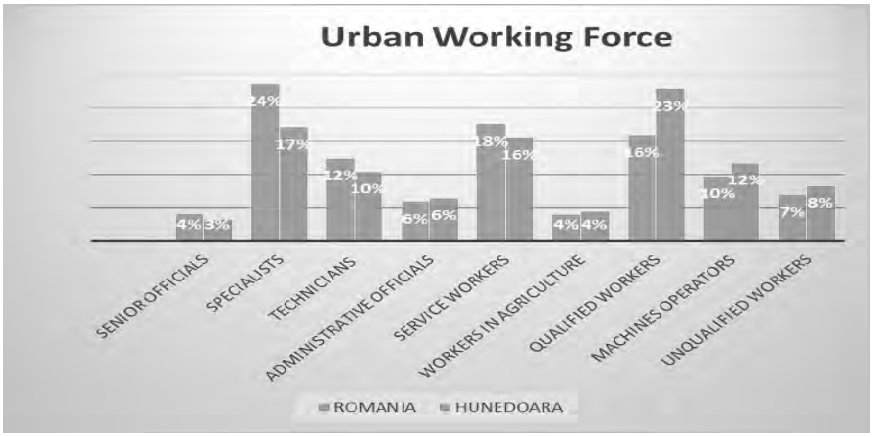

Figure 2 Urban working force type in Romania and Hunedoara County in 2011

Source: National Institute of Statistics Census 2011 - adapted

Analyzing the education level, we can see that the so called educated people (high school diploma or higher) are in a 45 percent in Hunedoara and in a 42 percent in Romania.

Table 3. Education Level in Romania and Hunedoara County in 2011

Education Level	Total population over 10 year	Academic	Technician diploma	High School	Vocational School	8 Grade Secondary school	4 Grade Elementary education	Uneducated
		ISCED 5-8	ISCED 4	ISCED 3		ISCED 2	ISCED 1	
ROMANIA	18.022.221	2.591.021	574.043	4.390.759	2.500.655	4.868.213	2.556.286	541.244
HUNEDOARA	380.621	51.789	17.138	100.453	55.417	98.492	50.062	7.270

Source: National Institute of Statistics Census 2011

We can also observe in figure 3 that Hunedoara has a small advantage at high school education and technician diploma.

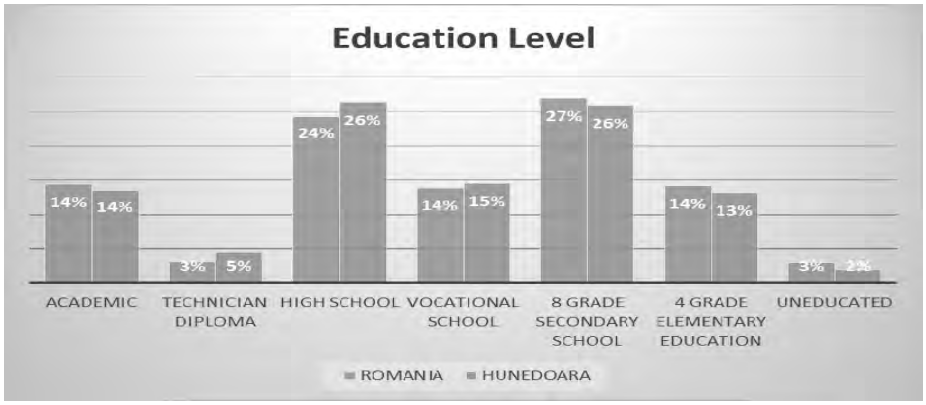

Figure 3 Education Level in Romania and Hunedoara County in 2011

Source: National Institute of Statistics Census 2011 - adapted

The future is unfortunately very discouraging for Hunedoara County as can see in figure 4.

We can conclude: even the level of seniors (persons over 65 years of age) is constant over the last 13 years and the following 7 years, **the level of young (smaller than 14 years of age) is dropping very sharp, with 43 percent in twenty years, with a lack of 31.000 of young in the last 20 years.**

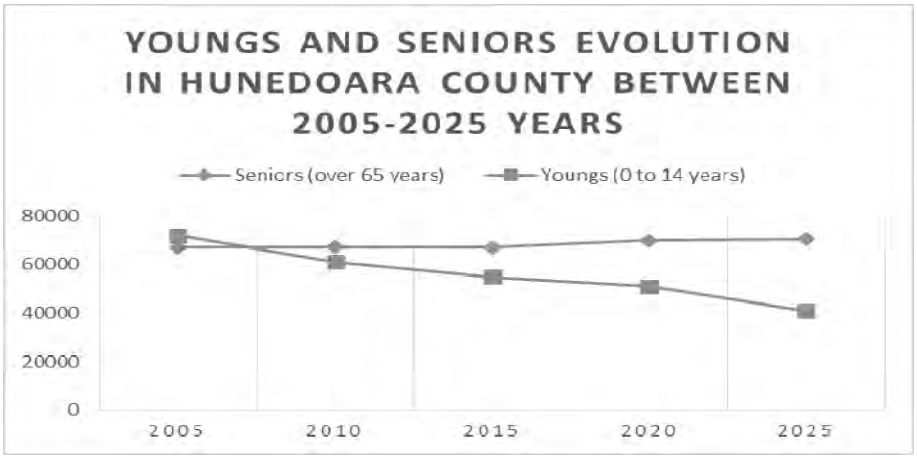

Figure 4 Young and Senior evolution in Hunedoara County

Source – National Institute of Statistics - Designing the population of Romania in territorial profile until 2025

In figure 5 we have included also the lapse of 14 to 24 years, but the percent remain almost the same - 46%. The lost is 44% for the kindergarten kids, 43% for the 8 grade school and 48% for the high school and student level of education.

We can conclude: **the disaster has alarming proportion – in Hunedoara the depopulation has also a natural cause – we have a 46% percent reduction of young population.**

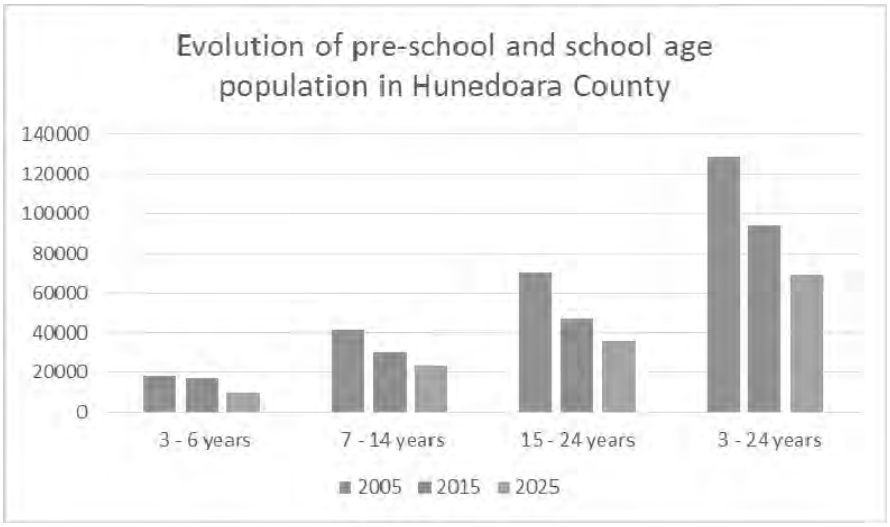

Figure 5 Evolution of pre-school and school age population in Hunedoara County

Source – National Institute of Statistics - Designing the population of Romania in territorial profile until 2025

Starting from the projection structure of the potential demand for training areas in the West Region, based on the Hunedoara County economic and labor market analysis, Local Committee on the Development of Social Partnership members appreciate that the structure of the potential demand for forecasting field in Hunedoara County is as follows:

Table 4. Structure of the potential demand by field of training in Hunedoara County (projection)

Education and training domain	Forecasts of the demand for training for 2013-2020 (%)
Mechanics	23%
Tourism	15%
Economic	8%
Building	8%
Automation	8%
Electric	7%
Electro - mechanic	6%
Commerce	5%
Environment protection	3%
Beauty	3%
Wood Industry	3%
Textile and leather industry	3%
Agriculture	2%
Forestry	2%
Food industry	2%
Chemical industry	2%

We can conclude: **there will be a deficit in the mechanical field and in tourism, and we must keep the level of qualification for the engineering - building, automation and electric, and also in economic and commerce.**

3. IT Trends in Territorial Administrative Units of Hunedoara County. Research methodology and results

In the virtue of the questionnaires we achieved the results. In order to analyze the statistical connections we used correlation analysis for the intensity of the connections between the variables and regression analysis to estimate the value of a dependent variable (effect) taking into account the values of other independent variables (causes). We carried out a multiple regression analysis in order to identify the effect that implementation of IT tools in Territorial Administrative Units of Hunedoara County, has over the population. (Edelhauser, 2014)

3.1. Methodology

The instrument used for collecting data is a quantitative questionnaire. We used the questionnaire as a technique for investigating the territorial administrative units in Hunedoara County regarding the IT level. The questionnaire used was focused on the level of IT using 25 questions.

3.2. Respondents

The study set sights on over 11 territorial administrative units from Hunedoara County, and data were collected in 2018 year. The survey led us to identify, bassed on the processing of the data gathered through the questionnaires and on the statistical data existing at national and county level, some trends in IT, trends that led us to a set of measures that we will propose to the decision-makers at county and national level. (Edelhauser, 2012)

Data were collected from 11 territorial administrative units from Hunedoara County, but these are representative for the year 2018 IT level, because there were selected from the 14 cities and municipalities of the county, and represent 74% of the urban population.

3.3. Findings and discussions. Graphical results and statistical analysis

An important question of the survey is focused on the informatio taht is posted on official sites of thre territorial administrative units. We can see that only 30% of the TAU's are in trend whit the digital era, and post the detailed information on their sites as we can see in figure 6.

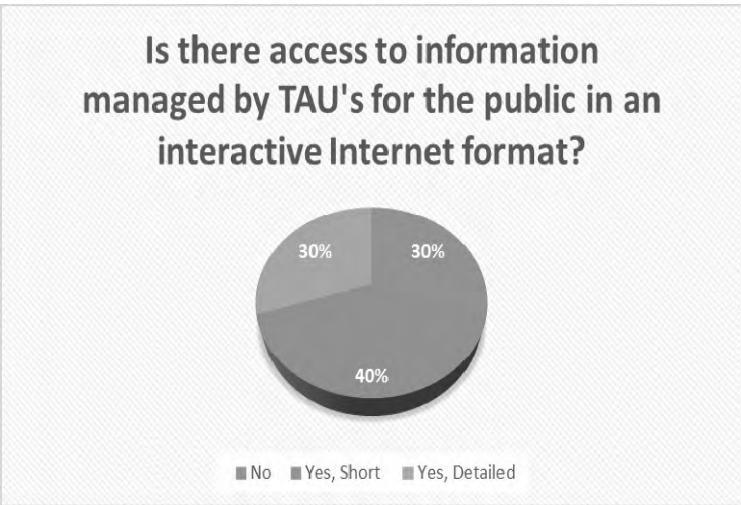

Figure 6 Question 13 - Is there access to information managed by territorial administrative units (TAU's) for the public in an interactive Internet format?

Other relevant question is focused on the personalized access of the citizens to the public data. We can see the percent of 30 presented in figure 6 is maintained also in figure 7 – only 36% of TAU's are using the full benefit of the Internet.

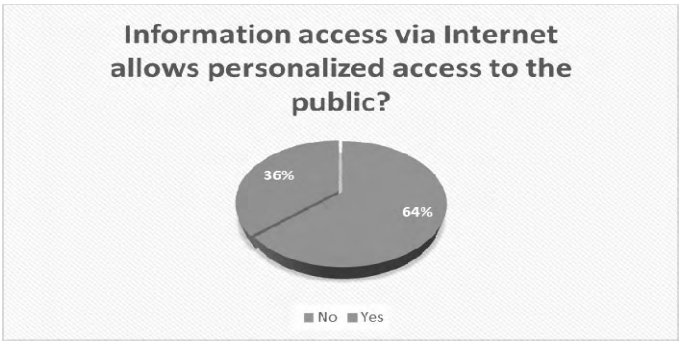

Figure 7 Question 15 - Information access via Internet allows personalized access to the public?

But the future is optimistic because 64% of the respondents consider that it will be useful to offer the personalized access for the public to TAU's data.

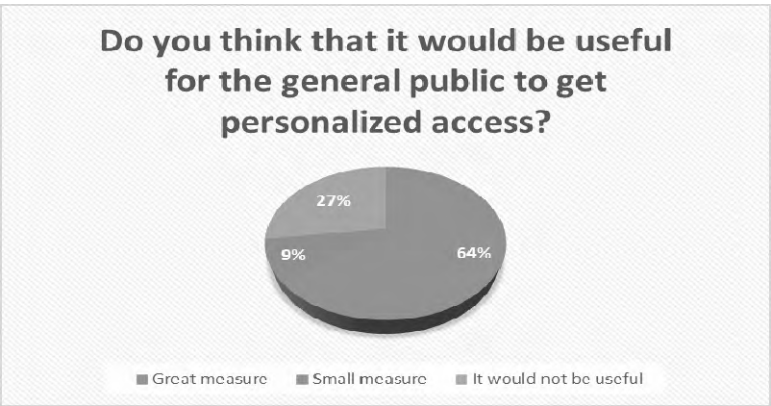

Figure 8 Question 16 - Do you think that it would be useful for the general public to get personalized access?

We carried out a multiple regression analysis in order to identify the effect that implementation of IT tools in Territorial Administrative Units of Hunedoara County will has over the population. We have analyze the statistical connections using the correlation analysis for the intensity of the connections between the variables and regression analysis to estimate the value of a dependent variable (effect) taking into account the values of other independent variables (causes).

Table 5. Regression analysis and correlation between the computers number of Territorial Administrative Units of Hunedoara County and the employee number for the most important 11 Territorial Administrative Units of Hunedoara County

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,956[a]	,914	,905	19,07048

a. Predictors: (Constant), City_Hall_Employee

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	34947,033	1	34947,033	96,092	,000[a]
	Residual	3273,148	9	363,683		
	Total	38220,182	10			

a. Predictors: (Constant), City_Hall_Employee

b. Dependent Variable: PC_

We noticed that there is a strong link (with a significance of correlation R = 0.956 > 0.63 for 11 degrees of freedom). F-test also has a high value (96.09), and the Sig. corresponding F statistics is 0.00 (0.00) which gives significant linear relationship between two variables. Because both F that has a high level, and significance Sig. is reduced, can be concluded that the results are not coincidental. The regression coefficient R=0,956 shows a strong link between the variable City_Hall_Employee showing the size of the organization, and the independent variable given to the level of IT - PC. The model explains 90.5% from the total variation of the variable PC (R^2= 0,905). The rest of 9.5% is influenced by other residual factors not included in the model. So the usage of the computers by the employee of the TAU's for the 11 selected organizations from the Territorial Administrative Units field is excellent.

Table 6. Regression analysis and correlation between the computers number of Territorial Administrative Units of Hunedoara County and the employee number **with access to these computers** for the most important 11 Territorial Administrative Units of Hunedoara County

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,960[a]	,922	,914	18,07367

a. Predictors: (Constant), PC_

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	34870,263	1	34870,263	106,749	,000[a]
	Residual	2939,919	9	326,658		
	Total	37810,182	10			

a. Predictors: (Constant), PC_

b. Dependent Variable: Information_System_User

We noticed that there is a strong link (with a significance of correlation R = 0.96 > 0.63 for 10 degrees of freedom). F-test also has a high value (106.74), and the Sig. corresponding F statistics is 0.00 (0.00) which gives significant linear relationship between two variables. Because both F that has a high level, and significance Sig. is reduced, can be concluded that the results are not coincidental. The regression coefficient R=0,96 shows a strong link between the variable Information_System_User showing the size of the organization, and the independent variable PC given to the level of IT. The model explains 92.2 % from the total variation of the variable Information_System_User (R^2= 0,922). The rest of 7.8 % is influenced by other residual factors not included in the model. So the usage of the computers by the employee of the TAU's for the 11 selected organizations from the Territorial Administrative Units field is excellent.

Discussion and conclusions

The paper has a high degree of novelty, this management analysis is the first of its kind performed in Hunedoara County.

We extract a set of conclusions:

- ✓ We find an excessive concentration of the urban working force in Hunedoara, so deindustrialization will affect in a more significant measure Hunedoara county
- ✓ We identify that we must qualify in the future the working force in Hunedoara to counterbalance the deficit of specialists
- ✓ We identify that the level of young (smaller than 14 years of age) is dropping very sharp, with 43 percent in in the last 13 years and next 7 years, with a lack of 31.000 of young
- ✓ We set that the disaster has alarming proportion – in Hunedoara the depopulation has also a natural cause – we will have a 46% percent reduction of young population in the last 13 years and next 7 years
- ✓ We set that there will be a deficit in the next 7 years, in the mechanical field and in tourism, and we must keep the level of qualification for the engineering - building, automation and electric, and also in economic and commerce.

And established a set of set of measures that we will propose to the decision-makers at county and national level:

- ➢ We will prepare the technical framework for attracting investors, which will include the development of a GIS for the Hunedoara County, focusing on identifying and shaping suitable locations for industrial parks
- ➢ We will prepare the professional framework for attracting investors by conducting a study on the age structure of the Hunedoara County population and its socio-professional profile in order to correctly focus the training of the high-school and university level of the labor force in the area

- We will develop a marketing plan to promote the tourism potential of the area and the university center through an integrated public relation strategy - Tourism through financing underprivileged mountain areas, because a total of 45 territorial administrative units of the county's 69 are included in Hunedoara, according to the national rural development plan, are in the less-favored mountain area
- We will carrying out a study to identify possible facilities that can be created for investors and existing companies in the Hunedoara County
- We will carrying out a study to identify potential investors to be informed about the situation of the area's infrastructure and the structure of the human resource in the area to attract them.

References

Boșcoianu, M., Bacali, L., Calefariu, E
2016
"Towards an Intelligent Academic Revolution - The New Role of Change Lleadership in Turbulent and Crisis Periods", Conference: 5th Review of Management and Economic Engineering International Management Conference, Sep 22-24, 2016, Pages: 233-239
Edelhauser, E., and Lupu Dima L
2012
"Management Information Systems. Past And Present in Romanian Organisations", Paper presented at the 11th International Conference on Informatics in Economy IE 2012, Bucharest, Romania
Edelhauser, E., Ionica, A. and Leba, M.
2014
"Modern Management Using IT&C Technologies in Romanian Organizations", Transformations in Business & Economics Volume: 13 Issue: 2B Pages: 742-759
Seelye, Katherine, Q.
"Detroit Census Confirms a Desertion Like No Other", The New York Times, Retrieved March 23, 2011
Zalewska, A. and Mickiewic, T.,
"Deindustrialisation: Lessons from the Structural Outcomes of Post-Communist Transition", Acta Oeconomica, Vol. 56, No. 2, pp. 143-166, 2006,
https://papers.ssrn.com/sol3/papers.cfm?abstract_id=311410
Rusu, B.
2016
"Difficulties in Finding Employment: Who is to Blame?", Conference: 5th Review of Management and Economic Engineering International Management Conference, Sep 22-24, 2016, Pages:261-268

DIFFERENT GENDER-BASED LEADERSHIP STYLES IN EDUCATION SECTOR IN ISRAEL

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Abstract

Nowadays, taking into consideration all the changes that took place in all the fields of life, especially in the education system, school principals face challenges and need to be leaders with direction of improving the teaching processes. In this research, the authors distributed the management styles questionnaire to male and female school principals in Israel. This research findings are a first step to recognize the problems in the style of management in today Israeli schools, to find out what are the desired styles for the modern era.

Purpose *–to examine leadership styles chosen my modern school principals in Israel. The authors researched a sample of school principals in Israel, compared their favorite leadership styles in males and females sample.*

Methodology/approach *- an empirical research consisted of distributing a management styles questionnaire to a sample of school principal of Israel, analyzing the data using a statistical tool SPSS.*

Findings *–the school principals in Israel are very authoritarian in their management style, men more than women, and also paternalistic (women more than men).*

Research limitations/implications *– it is not easy to get frank answers from the school principals, they are busy and not always ready to fill in the questionnaire.*

Practical implications *– this research findings are a first step to recognize the problems in the style of management in today Israeli schools, to find out what are the desired styles for the modern era.*

Originality/value *– the paper examined differences in female and male management styles in Israel.*

Key words: *management styles, school principals, education system in Israel.*

Introduction

A manager is one of the most important factors of the educational activity in school. Manager's style of working and the way the teachers see her – influence greatly the teachers' understanding and attitudes towards school and its role (Sotrak,2004). This means that the managers use as a model in the educational domain and have an impact on school's atmosphere and its ethics, teachers' behavior and effectiveness.

A central principal's role is to move and "lead" the school. That's why she needs to get different decisions in the pedagogical domain, to be aware of implications of these decisions and their influence on the quality of teaching and learning (Levi, 2009). In the last few years, we all witness lots of changes in all the fields of life, especially in the education system, which force the manager to be a leader and a principal at the same time.

The principal is a part of education staff professional development, and a professional growth of a teacher should help her to adapt to the vast amount of rapid changes of the science and technology era. In addition, professional development of a teacher should make her stronger and prevent erosion, support and involvement of a principal are very important for the success of this professional growth.

There are lots of management styles, such as dictatorial, democratic, and paternalistic. School principal can adopt one of them and lead the school accordingly (Horvitz, 2008).

Management styles at school

Leadership is a term connected to a human ability to influence others and move them towards assignments' accomplishment, sometimes above their own earlier expectations, at the high level of obligation, using the minimal amount of forcing means (Johnson and Giorgis,2003). The things are made the way giving some inspiration to others and causing them to support the leader, because this is the right thing to do (Evans, 2001).

There are lots of leadership styles, the authors detail the most important:

Paternalistic leadership – symbolizes a manager who actually blurs the limitations between herself and the teachers, since she chooses to be their "friend" and not a manager. This kind of manager is highly supportive, cheering personal communications and strengthening the bond between the educational staff and striving to get a satisfaction of the staff from their work. According to Fidler's theory (1967) and others, one of the most important roles of a leader is inspiring the participants (teachers) and giving them a motivation to act being satisfied with their job (Ben BaruchGuri-Rozenblit, 2002). The second style, **structural leadership**, claims that the manager is a vision owner and acts with a sense and logic, often using an entrepreneurship approach. The manager strives to promote a school, but she is not bothered by the human relations, which could bring to teachers' dropout (Elhanan, 2007). The other kind of leadership is a **decentralized leadership**. This leadership supports a cooperation between the teachers and the manager in making decisions or in control over school, especially in the pedagogical processes. For this kind of leader, it is extremely important to give the teachers a chance to be partners in the decision making process at school. This importance stems from the high level of knowledge teachers have about a pedagogy and the learning at school, and from their closer connection to the pupils. It is important to note that such an opportunity can be supplied only by a school principal (Ofrim, 2013).

Leadership is both a research area and a practical skill encompassing the ability of an individual or organization to "lead" or guide other individuals, teams, or entire organizations. Specialist literature debates various viewpoints, contrasting Eastern and Western approaches to leadership, and also (within the West) US vs. European approaches. US academic environments define leadership as "a process of social influence in which a person can enlist the aid and support of others in the accomplishment of a common task" (Chin, 2015).

There are many methods to classify leadership styles. The authors chose to do it according to the question in Survey Monkey.

Style A = Autocratic Leadership Style : In this style, the complete authority is in one person's hand and no one else can question it. It is also known as totalitarianism or dictatorship. It does forge an atmosphere of discipline in the organization. However, it can at times cause dissatisfaction and a lack of "creative space" for the employees. For such a manager, the employees are just a replaceable resource and not the core of the organization. The manager believes in top-down communication, wherein orders are given by the higher hierarchical level to the lower ones. The concept of "employee satisfaction" does not hold importance for such a manager.

Style B = Bureaucratic Leadership Style: Bureaucratic leaders work "by the book." They follow rules rigorously, and ensure that their staff follows procedures precisely. This is a very appropriate style for work involving serious safety risks (such as working with machinery, with toxic substances, or at dangerous heights) or where large sums of money are involved (such as handling cash).

Style C = Democratic Leadership Style : In this style, the management allows the employees to voice their opinions. Most company policies and decisions are made, taking into consideration employee opinions. It is also known as 'participative style'. This means that a meeting is held with representatives from each hierarchical level, in order to take a decision about the smallest company policies, as well as the major ones. Such a manager will prefer to have an open-door policy in the organization to ensure that the management and the employees communicate openly and freely with each other. "Confidentiality" is not of much a substance to such a manager.

Style D = Laissez Faire Leadership Style: In this management style, the targets are communicated to the employees; however, the employees can go about meeting those targets in whichever way they want. It is a very liberal management style. However, there is a lot of chaos in the delegation of authority as well as responsibility. Communication is free; however, more through the grapevine. This leads to the employees taking their work for granted. On the other hand, the manager evades his/her duty very conveniently. If out of control, this management style can spell "doom" for an organization. However, it is adopted in control by many organizations these days.

Style E = Paternalistic Leadership Style: In this style, the authority is in the hand of one individual. However, that one individual cares more about the employees than outcomes and profits. That means the manager will be more like a parent rather than a boss. In this kind of a management style also, the complete authority lies in the hands of one individual; however, the method of functioning is very different as compared to autocratic style. In such a management style, the employees are the heart of the organization. "Employee satisfaction" holds higher priority than profits. This kind of a manager believes in top-down as well as bottom-up communication. The management styles outlined above are more closely linked to the personality and leadership qualities of a leader-manager. They are based on the style and principles followed by a manager in particular, not the organization, as a whole. If there is a change in a manager, an autocratically managed organization can become a paternalistic one!

One of the important research questions was whether there exist gender-based differences in the style the manager chooses to function.

Materials and methods of research

The authors of this papers wondered whether there are styles more characteristics to females than to males in the education field. In order to do so, they gathered a sample of 135 school principals, 87 males and 47 females. SPSS statistical tool was used to compare the demographic characteristics and leadership styles of the two genders (males and females).

Figure 1 describes the age distribution be gender (gender=1 for males, gender =2 for females).

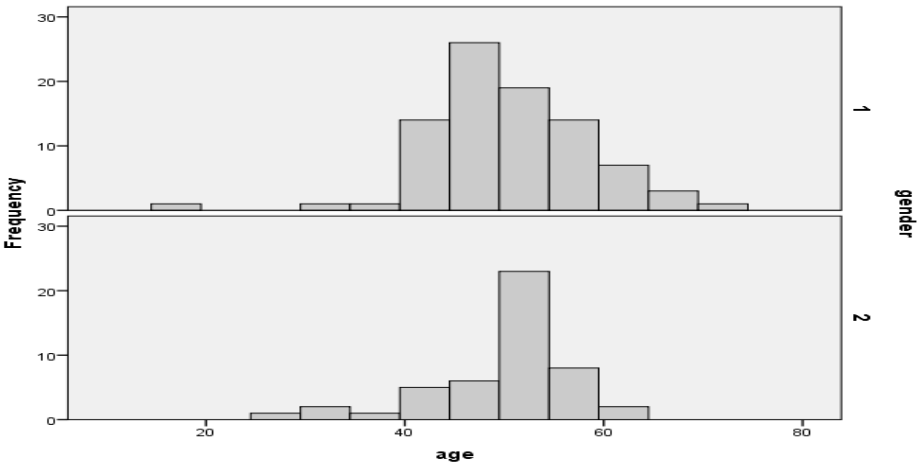

Figure 1: age frequency table gender = 1 male gender= 2 female

There were no significant differences in the average age between the genders.

Figure 2 presents the frequencies of work experience by gender.

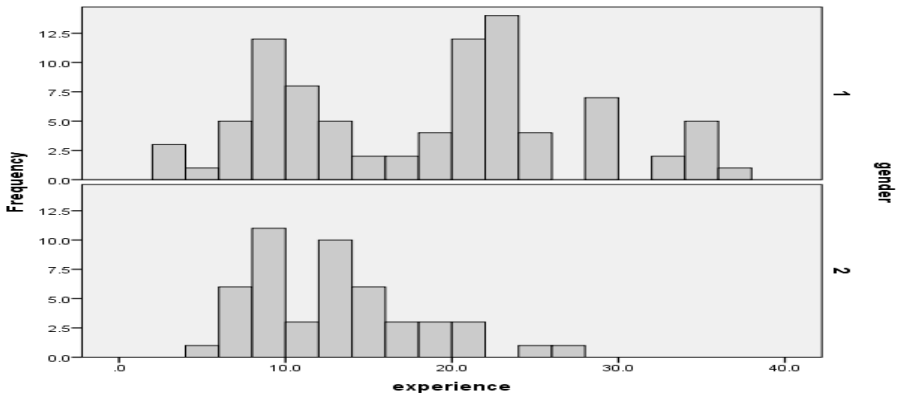

Figure 2: experience frequency table gender = 1 male gender= 2 female

The average experience is definitely higher in the males group (p_value<0.00001), so is the variance (p_value<0.00001).

Figure 3 presents the autocratic management styles of the gender.

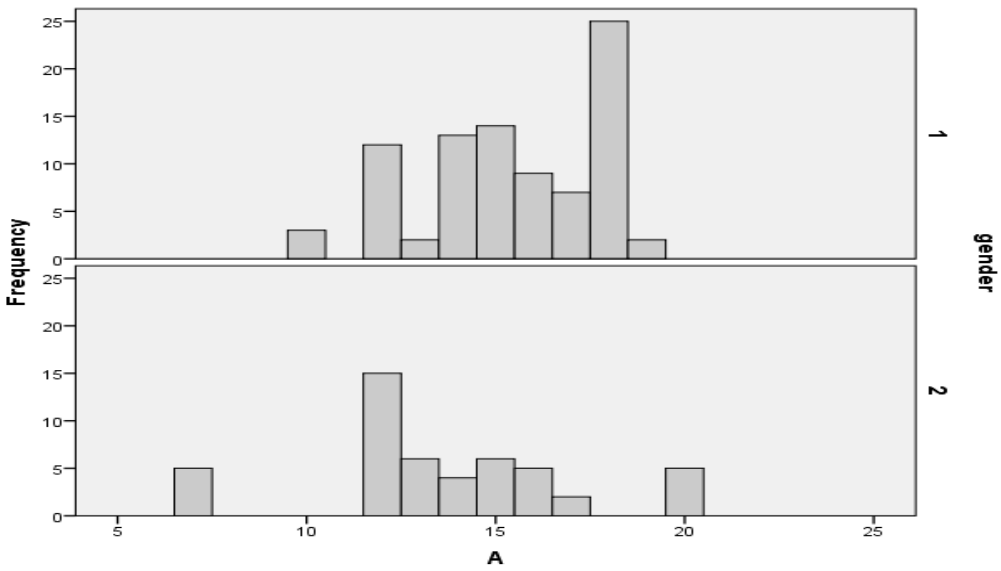

Figure 3: autocratic management style gender = 1 male gender= 2 female

Definitely, the male principals are on average much more autocratic than the female ones (p_value<0.00001).

Also, it was found out that in the sample under consideration the males are more bureaucratic and also more democratic than females (p_value<0.05).

Figure 4 presents that male school principals are more not –intervening ones.

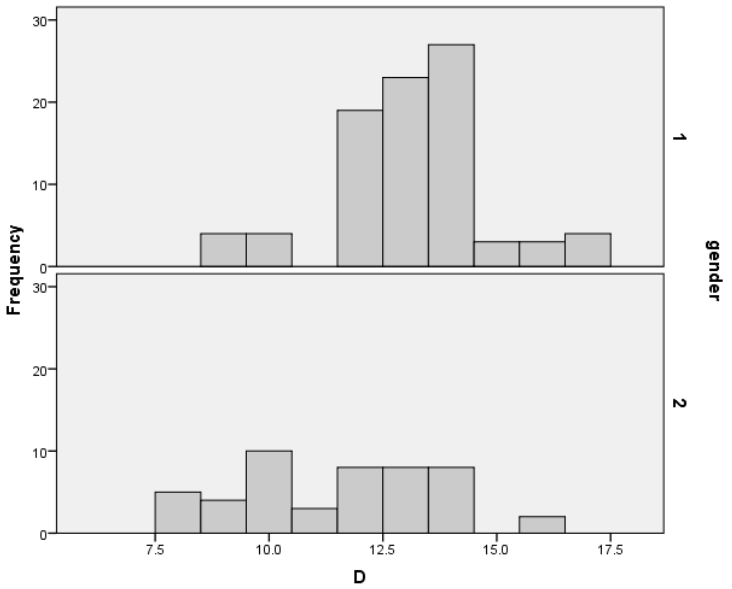

Figure 4: Laissez Faire management style gender = 1 male gender= 2 female

Laissez Faire Leadership Style is more characteristic of males.

The Paternalistic style was not found more characteristic to any of the genders.

Figure 5 summarizes the five management styles values for the male and female principals, in a Box-plot diagram.

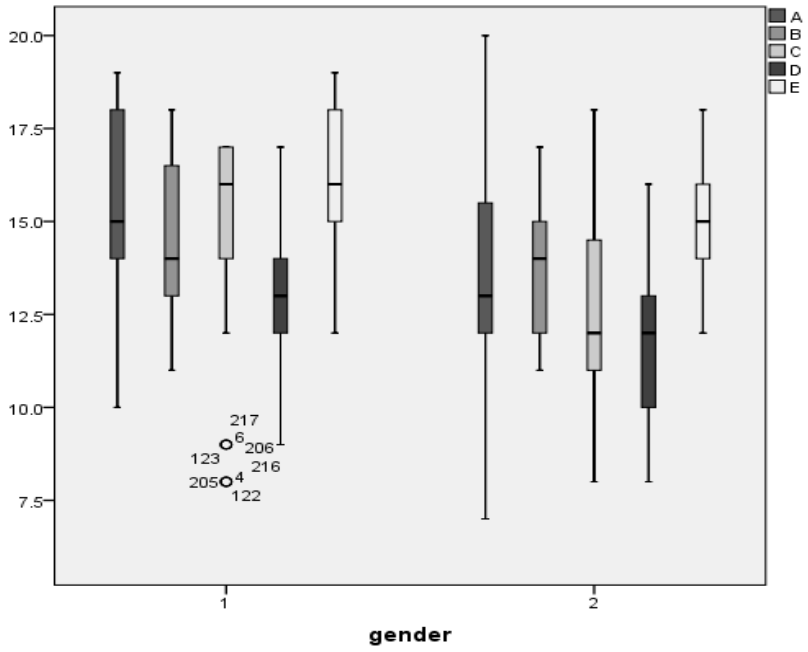

Figure 5: Box-plot diagram for the 5 management styles gender = 1 male gender= 2 female

Discussion and conclusions

The 21-t century is an important era of lots of technological and social changes getting into all the fields of life, especially in the education system, which makes the managers to give up on the traditional approach towards their role and adopt new styles of managing, implement them in order to fit in the constantly changing society. School principals are looking for the right ways to manage, and try to promote a progress and professional development, to make their management more effective. All these goals can be accomplished when the principal makes teachers feel belonging, loved and appreciated, able to advance within the educational institution they work in. A successive manager is more available to the others, supports discussions and even critique, doubts expression and negotiations.

According to this research, in the education sector of Israel, there are lots of autocratic managers, both males and females, lots of bureaucratic and paternalistic ones. The democratic style is not a significant part of management styles of school principals is Israel, and maybe this is the point where the Israeli education system should change.

References

Ben Baruch, A. and Sh. Guri- Rozenblit
2002
“Challenges in school management.” The Open University Press.
Chin, R.
2015
"Examining teamwork and leadership in the fields of public administration, leadership, and management". Team Performance Management. 21 (3/4): 199.
Elhanan, B.
2007
“School management style and its influence on the institutional climate. Eye connection”. Journal of high school teachers organization, 172: 22-24.
Evans, G.
2001
“Cultural planning: an urban renaissance?” London, Routledge Chp8, p.212-258.
Fiedler, F. E.
1967
“A Theory of Leadership Effectiveness”, New York: McGraw-Hill.
Horvitz, T.
2008
Individual versus society. Dapim, 46: 11-20.
Johnson, N. J. and C. Giorgis
2003
“Leadership”, The Reading Leader, Newark, 56 (6).
Levi, A.
2009
“Pedagogical leadership- analysis, definition, action fields and implementation keys.“ Education Echo,4, pp. 70-71.
Ofrim, I.
2013
Research essence abstract on “School leadership and pupils’ achievements.” Jerusalem: Avnei Rosha Institute.
Sotrak, R.
2004
“Study at educational management”. Darwael press. Aman (Arabic).
https://www.surveymonkey.com/r/CPD66BM

AN ANALYTIC HIERARCHY PROCESS APPROACH FOR THE CONCRETE BATCHING PLANT SELECTION

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Abstract

Purpose *– The purpose of this paper is to apply Analytic Hierarchy Process (AHP) to help the management of an important construction company to assess a selection of the most suitable concrete batching plant.*

Methodology/approach *- The model begins by detecting the main criteria using literature review and ranking the main criteria according to experts' opinions using AHP. The next phases consist of determining a priority order among the alternatives that have proven to be viable.*

Findings *– The concrete batching plants are selected and ranked based on identified criteria. In order to assess the effects of changes in the main criteria on the alternatives ranking, sensitivity analysis was performed and the results indicated that the ranking is robust.*

Research limitations/implications *– The limitations of this article concern the number of alternatives taken into account.*

Practical implications *– The findings revealed that the AHP methodology approach proposed in this study may be a useful tool to support managers from the construction industry in dealing with the problem of selecting suitable concrete batching plant for their particular applications.*

Originality/value *– This work proposes an application of the AHP method to select the most appropriate concrete batching plant. The AHP methodology adopted provides managers from construction industry with the insights of the multiple factors that need to be taken into account while selecting a concrete batching plant.*

Key words: *multi-criteria decision making, Analytic hierarchy process (AHP), construction equipment selection, concrete batching plant.*

Introduction

The construction projects request various types of equipment and machineries having their own level of application (Waris et al., 2014). The regular application of construction equipment contains but is not limited to concreting, earthwork, building, structural steel works, lifting and positioning of components (Mahbub, 2012). The equipment acquisition is capital intensive for construction companies, being considered as an important financial burden throughout the construction phase beside other expenditures (Prasertrungruang and Hadikusumo, 2007). The studies indicated that the acquisition of heavy equipment represents thirty-six percent of the total project cost and induces high risk and uncertainties for the owners (Yeo and Ning, 2006).

The concrete batching plant is one of the most important equipments in the construction industry, playing a vital role in enhancing construction performance (Panasa and Pantouvakisb, 2013). It is used to mix various materials, especially including water, cement, aggregates and sand to create required quality concrete without which building any construction project would not be possible. Thus, the construction project success depends largely on the proper selection of required concrete batching plant which produces the concrete.

For selecting the suitable construction equipment for a project, the management of any construction company should take into account diverse criteria, for that reason, this process can be defined as a multi-criteria decision making (MCDM) problem (Temiz and Calis, 2017). MCDM represents one of the most important branches of decision theory and is used to establish the best solution from all possible solutions available (Huang, Chen and Chang, 2015). The selection and use of the suitable equipment may improve productivity and increase products' quality (Oţel, 2018).

There are numerous researchers that have applied diverse approaches for solving different construction equipment selection problems. An AHP-based model for selecting cranes, concrete pumps and formwork systems was developed by Goldenberg and Shapira (2007). Onut, Kara and Mert (2009) integrated fuzzy analytical network process (ANP) and TOPSIS to select a material handling equipment for a steel construction company. ELECTRE III method was applied to deal with the concrete pump selection problem (Ulubeyli and Kazaz, 2009). Yılmaz and Dağdeviren (2011) developed a system which combines fuzzy PROMETHEE and zero-one goal programming to the equipment selection problem. Lashgari et al. (2012) proposed a model based on the ANP, fuzzy AHP, and TOPSIS methods for selecting the loading and hauling system. Phogat and Singh (2013) applied AHP, simple additive weights method (SAW), ELECTRE, PROMETHEE and TOPSIS for selecting the adequate construction equipment for a road construction project.

This work proposes an application of the AHP method to select the most suitable concrete batching plant. No study, to the best of our knowledge, has proposed an application of the AHP method to select the best alternative of a concrete batching plant.

The rest of the paper is organized as follows: in the second section the methodology of multi-criteria decision making is described. The third section presents the case study based action research for the concrete batching plant performance evaluation. The results are presented in the fourth section and, finally, the last section outlines the most important conclusions.

Methodology

The AHP (Saaty, 1989) represents a robust multi-criteria decision-making method for dealing with complex decision problems. Essentially, AHP is based on three underlying concepts: organizing the decision problem as a hierarchy of goal, criteria and alternatives, pair-wise comparison of components at each level of the hierarchy taking into account each criterion on the preceding level, and ultimately vertically synthesizing the judgments over the different levels of the hierarchy (García-Cascales and Lamata, 2009). The main AHP application steps are as follows (Saaty, 1989); (Alaqeel and Suryanarayanan, 2018):

The first step of AHP is to model de problem as a hierarchy, containing the goal of the analysis, the criteria and determine the alternatives which are most suitable to fulfill the objective.

The second step is to construct the judgment matrix, a squared matrix, based on decision maker's judgments. The matrix contains priority weights among the criteria based on pairwise comparisons among the criteria. Saaty, (1989) proposes the use of ratio scales to assess the decision maker's preferences, known as Saaty's rating scale, presented in table 1.

Table 1. Saaty's rating scale (Saaty, 1989)

Numeric scale	Definition
1	Equal importance
3	Moderate importance of one over the other
5	Strong importance of one over the other
7	Very strong importance of one over the other
9	Extreme importance of one over the other
2, 4, 6, 8	Intermediate values

The judgment matrix has the following structure:

$$A = \begin{bmatrix} 1 & a_{12} & \cdots & a_{1n} \\ a_{21} & 1 & \cdots & a_{2n} \\ \vdots & \vdots & 1 & \vdots \\ a_{n1} & a_{n2} & \cdots & a_{nn} \end{bmatrix} \quad (1)$$

where:

A – judgment matrix;

$$a_{ij} = \frac{x_i}{x_j} \quad (2)$$

where:

x_i and x_j – weight values of i and j, respectively;

i and j = 1, 2 … n;

n – number of factors in the judgment matrix.

The third step is to determine a weight vector, x, representing the relative weights of the elements of hierarchy as follows:

$$A \cdot x = \lambda_{max} \cdot x \quad (3)$$

where:

λ_{max} – largest eigenvalue of A.

The vector, x, is determined by normalizing the principle eigenvector of A. The next step is to assess judgment consistency. The pairwise comparisons in a judgment matrix are considered to be adequately consistent, if the corresponding consistency ratio (CR) is less than ten percent. Consistency index (CI) is determined as follows:

$$CI = \frac{\lambda_{max} - n}{n - 1} \quad (4)$$

The random index (RI) is calculated as follows:

$$RI = \frac{1.98 \cdot (n - 2)}{n} \quad (5)$$

Next the consistency ratio is obtained by dividing the consistency index value by the random index, as follows:

$$CR = \frac{CI}{RI} \quad (6)$$

If the corresponding consistency ratio is less than ten percent, the level of inconsistency is considered acceptable. Otherwise, the decision maker has to revise his/her judgments. In order to establish the priorities for each criterion, the previous steps are repeated with the alternatives.

Case Study

In order to exemplify and validate the application of the proposed multiple criteria decision making method for solving the construction equipment selection problem, a case study conducted in collaboration with the management of a large leading firm working in construction industry is presented. The hierarchical representation for selection of the most appropriate concrete batching plant problem is shown in Figure 1.

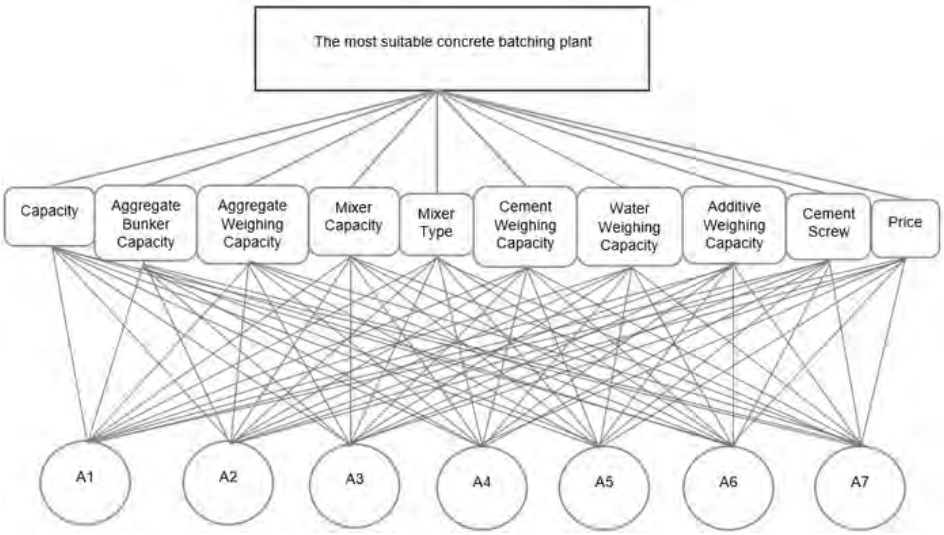


Figure 1. Hierarchical representation of the most appropriate concrete batching plant selection problem

This case study deals with the concrete batching plans selection among a set of seven alternatives (A1, A2, A3, A4, A5, A6 and A7), according to a set of requirements mentioned by the decision makers. The concrete batching plants are important elements in the concrete construction processes and cost tens of thousands to hundreds of thousands of Euros depending on its performance. The assessment was accomplished by managers whose different points of view have to be included in the model. The decision makers were interviewed for identifying the most appropriate criteria.

The decision makers have proposed ten criteria (C1 to C10) in order to perform an adequate evaluation of the construction equipment. The determined criteria are presented as follows: capacity (C1 – [m^3/h]), aggregate bunker capacity (C2– [m^3]), aggregate weighting capacity (C3 – [kg]), mixer capacity (C4– [l]), mixer type (C5 – [points]), cement weighing capacity (C6 – [kg]), water weighing capacity (C7 – [kg]), additive weighing capacity (C8 – [l]), cement screw (C9 – [mm]) and price (C10 – [Euro]).

Results

After the alternatives and criteria have been defined by the decision makers, the criteria weights can be calculated based on the AHP method procedure. Using the Saaty's rating scale, the judgment matrix was determined. After the judgment matrix was normalized, the criteria weights were identified, and described in table 2, along with the matrix. The most important criterion is C1 with an influence of twenty-eight percent, followed by C10 with about twenty percent and C4, C5 with about fourteen percent. The CR is approximately two percent, less than the boundary value of ten percent which indicates that the ranking obtained is consistent.

Table 2. Judgment matrix and criteria weights

	C1	**C2**	**C3**	**C4**	**C5**	**C6**	**C7**	**C8**	**C9**	**C10**	**Criteria weights**
C1	1	5	6	3	3	7	7	7	5	2	0.28
C2	0.2	1	2	0.333	0.333	3	3	3	1	0.25	0.064
C3	0.167	0.5	1	0.25	0.25	2	2	2	0.5	0.2	0.042
C4	0.333	3	4	1	1	5	5	5	3	0.5	0.136
C5	0.333	3	4	1	1	5	5	5	3	0.5	0.136
C6	0.143	0.333	0.5	0.2	0.2	1	1	1	0.333	0.167	0.027
C7	0.143	0.333	0.5	0.2	0.2	1	1	1	0.333	0.167	0.027
C8	0.143	0.333	0.5	0.2	0.2	1	1	1	0.333	0.167	0.027
C9	0.2	1	2	0.333	0.333	3	3	3	1	0.25	0.064
C10	0.5	4	5	2	2	6	6	6	4	1	0.198

λ_{max}=10.26 CI=0.029 CR=0.0196

Using the same procedure, all the comparison matrices were determined by comparing the alternatives with respect to each criterion and their local weights. Tables 3-6 present the comparison matrices of the alternatives with respect to the most important four criteria: C1, C10, C4 and C5.

Table 3. The comparison matrix of the alternatives with respect to capacity

	A1	A2	A3	A4	A5	A6	A7	Local weights
A1	1	0.333	0.333	0.333	0.167	0.143	0.111	0.026
A2	3	1	1	1	0.25	0.2	0.143	0.055
A3	3	1	1	1	0.25	0.2	0.143	0.055
A4	3	1	1	1	0.25	0.2	0.143	0.055
A5	6	4	4	4	1	0.5	0.25	0.164
A6	7	5	5	5	2	1	0.333	0.228
A7	9	7	7	7	4	3	1	0.417

λ_{max}=7.25 CI=0.0416 CR=0.031

The findings showed that A7 and A6 were ranked as the best options with respect to capacity, followed by A5, A3, A4, A2 and A1.

Table 4. The comparison matrix of the alternatives with respect to price

	A1	A2	A3	A4	A5	A6	A7	Local weights
A1	1	5	3	6	7	8	9	0.424
A2	0.2	1	0.333	2	3	4	5	0.126
A3	0.333	3	1	4	5	6	7	0.238
A4	0.167	0.5	0.25	1	2	3	4	0.087
A5	0.143	0.333	0.2	0.5	1	2	3	0.058
A6	0.125	0.25	0.167	0.333	0.5	1	2	0.039
A7	0.111	0.2	0.143	0.25	0.333	0.5	1	0.027

λ_{max}=7.305 CI=0.051 CR=0.038

It is noticed that A1 was preferred over the other concrete batching plants with respect to price, being the most adequate solution. At the other extreme, A7 is positioned at the bottom of the ranking, which means that it represents the least preferred alternative.

Table 5. The comparison matrix of the alternatives with respect to mixer capacity

	A1	A2	A3	A4	A5	A6	A7	Local weights
A1	1	0.5	0.5	0.5	0.25	0.167	0.125	0.034
A2	2	1	1	1	0.333	0.2	0.143	0.055
A3	2	1	1	1	0.333	0.2	0.143	0.055
A4	2	1	1	1	0.333	0.2	0.143	0.055
A5	4	3	3	3	1	0.333	0.2	0.129
A6	6	5	5	5	3	1	0.333	0.243
A7	8	7	7	7	5	3	1	0.43

λ_{max}=7.188 CI=0.0314 CR=0.023

Table 6. The comparison matrix of the alternatives with respect to mixer type

	A1	A2	A3	A4	A5	A6	A7	Local weights
A1	1	0.333	3	0.2	0.2	0.2	0.2	0.045
A2	3	1	5	0.333	0.333	0.333	0.333	0.088
A3	0.333	0.2	1	0.143	0.143	0.143	0.143	0.025
A4	5	3	7	1	1	1	1	0.21
A5	5	3	7	1	1	1	1	0.21
A6	5	3	7	1	1	1	1	0.21
A7	5	3	7	1	1	1	1	0.21

λ_{max}=7.13 CI=0.0168 CR=0.022

The comparison matrix of the alternatives with respect to mixer type indicates that A4, A5, A6 and A7 were ranked as the best options, being no preference between them. The consistency ratio for each comparison matrix is less than ten percent, which confirms the validity of the results obtained.

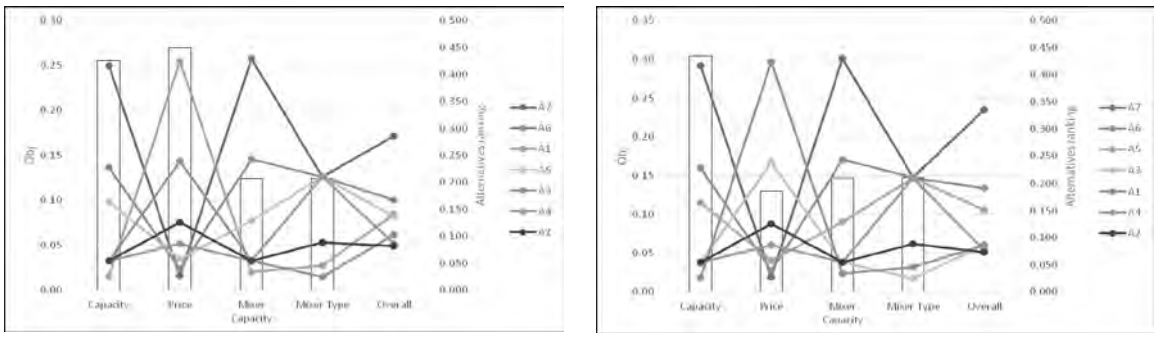
The final matrix is presented in table 7, being obtained by gathering all the local weights from each comparison matrix performed for each criterion. By multiplying the final matrix with the criteria weights, the final ranking is obtained, which is also presented in table 7, and it indicates the optimal solution to the problem considered.

Table 7. Final matrix and final ranking

	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	Final ranking
A1	0.026	0.039	0.033	0.034	0.045	0.033	0.041	0.053	0.051	0.424	0.113
A2	0.055	0.064	0.052	0.055	0.088	0.054	0.066	0.098	0.088	0.126	0.078
A3	0.055	0.039	0.052	0.055	0.025	0.054	0.066	0.098	0.088	0.238	0.09
A4	0.055	0.064	0.052	0.055	0.21	0.054	0.066	0.098	0.088	0.087	0.086
A5	0.164	0.199	0.164	0.129	0.21	0.129	0.163	0.098	0.158	0.058	0.144
A6	0.228	0.199	0.228	0.243	0.21	0.184	0.242	0.098	0.158	0.039	0.18
A7	0.417	0.396	0.418	0.43	0.21	0.493	0.355	0.456	0.369	0.027	0.31

By applying the AHP method procedure for selecting the most suitable concrete batching plant, it can be noticed that A7 was preferred over the other alternatives, being the most adequate solution. This alternative has the highest local weight to most criteria, the price being one of the criteria that didn't obtain a favorable score. Finally, A2, A4 and A3 got the worst evolution according to the analyzed criteria.

This sensitivity analysis is performed to investigate the effect of changing criteria weights of the most important four criteria on the alternatives' ranking. The objective (Obj) was to increase and decrease each criterion weight by seven percent and to study the effects on the analyzed alternatives. The results of sensitivity analysis with regards to price's upward change are presented in figure 2(a). It can be found that the new ranking of the cement batching plants is (A7, A6, A1, A5, A3, A4 and A2). The results of sensitivity analysis with regards to price's downward change are presented in figure 2(b). It can be noticed that the new ranking is (A7, A6, A5, A3, A1, A4, and A2).



(a) (b)

Figure 2. Sensitivity analysis with regards to price: (a) upward change; (b) downward change

The results of sensitivity analysis in what regards the concrete batching plant's capacity and the mixer capacity indicate that the alternatives ranking is robust, and is not changing regardless of criteria weight's varying. The results of sensitivity analysis with regard to the mixer type show that the ranking is not modifying when criterion weight varies excepting the case the weight alters more than ten percent. Then the alternatives on the last two places are changing places between them.

Conclusions

The concrete batching plant plays an important role in the construction performance increase. The selection process requires the assessment of various alternatives based on different criteria and can

contribute to enhance the competitiveness and outperform their competitors. This paper proposed an application of a multiple criteria decision making methods, namely the AHP method, to deal with concrete batching plant selection. The proposed decision making model has been implemented to an equipment selection process of a company from construction industry. The results reveal that AHP method may be a valuable tool to support managers from the construction industry in facing the problem of selecting the adequate equipment. The results of sensitivity analysis identified that the ranking of the concrete batching plants is robust.

References

Alaqeel, T.A. and Suryanarayanan, S.
2018
A fuzzy Analytic Hierarchy Process algorithm to prioritize Smart Grid technologies for the Saudi electricity infrastructure, Sustainable Energy, Grids and Networks, 13: 122–133.

García-Cascales, M.S. and Lamata, M.T.
2009
Selection of a cleaning system for engine maintenance based on the analytic hierarchy process, Computers & Industrial Engineering 56: 1442–1451.

Goldenberg, M. and Shapira, A.
2007
Systematic evaluation of construction equipment alternatives: case study, Journal of Construction Engineering and Management, 133: 72-85.

Huang, T.C.K., Y.L. Chen and Chang, T.H.
2015
A novel summarization technique for the support of resolving multi-criteria decision making problems, Decision Support Systems, 79:109–124.

Mahbub, R.
2012
Readiness of a developing nation in implementing automation and robotics technologies in construction: A case study of Malaysia, Journal of Civil Engineering and Architecture, 6(7): 858-866.

Onut, S., Kara, S.S. and Mert, S.
2009
Selecting the suitable material handling equipment in the presence of vagueness, International Journal of Advanced Manufacturing Technology, 44: 818–828.

Oţel, C.C.
2018
Study on the application of MISENIT and STEM methods in determination of the technical level of the machine tools, Review of Management and Economic Engineering, 17(1): 118-126.

Panasa, A. and Pantouvakisb, J.-P.
2013
Simulation-Based Concrete Truck-Mixers Fleet Size Determination for On-Site Batch Plant Operation, Procedia - Social and Behavioral Sciences, 74: 459 – 467.

Phogat, M.V.S. and Singh, A.P.
2013
Selection of equipment for construction of a hilly road using multi criteria approach, Procedia - Social and Behavioral Sciences, 104: 282 – 291.

Prasertrungruang, T. and Hadikusumo, B.H.W.
2007
Heavy equipment management practices and problems in Thai highway contractors, Engineering, Construction and Architectural Management, 14(3): 228-241.

Saaty, T. L.
1989
Group decision making and the AHP, New York: Springer-Verlag.

Temiz I. and Calis, G.
2017
Selection of Construction Equipment by Using Multi-criteria Decision Making Methods, Procedia Engineering, 196: 286 – 293.

Ulubeyli, S. and Kazaz, A.
2009
A multiple criteria decision-making approach to the selection of concrete pumps, Journal of Civil Engineering and Management, 15(4): 369-376.

Yeo, K.T. and Ning, J.H.
2006
Managing uncertainty in major equipment procurement in engineering projects, European Journal of Operational Research, 17(1): 123–134.
Yılmaz, B. and Dağdeviren, M.
2011
A combined approach for equipment selection: F-PROMETHEE method and zero–one goal programming, Expert Systems with Applications, 38: 11641–11650.
Waris, M. et al.,
2014
Criteria for the selection of sustainable onsite construction equipment, International Journal of Sustainable Built Environment 3: 96–110.

EDUCATION EFFECT ON PROMOTION IN THE ISRAELI ELECTRIC CORPORATION

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Abstract

Purpose: as part of my doctoral thesis, which dealt with the effects of personality factors on promotion in the IEC, the Israeli Electric Corporation, I added the factor of education in order to test its effect on the promotion.

Methodology/approach: The method used was applying exploratory factor analysis to examine the effects of education as well as other traits, on job promotion, Pearson Correlation as well as least square, linear regression analysis.

Findings: it was a reassuring to find a positive connection between education and promotion in the IEC. Furthermore, it was one of the most

Research limitations/implications: the IEC is currently under a massive reform, not much is known of its future. It plans to cut about a third of its employees in the near future and it loses its monopoly status. Some of the finding in this article might not be valid for the new company that the IEC will turn to. Having said that, this research might be valid for other government owned companies.

Practical implications: it was proven that education does positively affect employee's promotion in the IEC. Employees might turn to higher education in order to increase their chance of being promoted.

Originality/value: it might be a common belief that education should play a role in job promotion, this research proves that this is the case, at least in the IEC.

Key words: *Promotion, Education, Management tool*

Introduction

It is popular to believe that education is important, Many studies have for the most part supported institutional factors, such as college education, previous experience, over individual factors that link personal traits with career success and job promotion (Stahl, Chua et al. 2009). The higher the education degree the more effect it has on higher promotion levels (Brink, Norman et al. 2016). In Addition, general intellectual capacity could predict some early to middle administrative promotion stages (Cavazotte, Moreno et al. 2012). However, does the education factor effects only the private sector, what about veteran, government owned corporations? This study was conducted as part of a doctoral thesis about the effect of personality traits on promotion in the IEC which included two other factors, Gender and Education.

Context

The Israeli Electric Corporation, the IEC, is a veteran corporation. It was founded in the year 1923 and is older than the state of Israel itself. As such, the organization employ traditional career systems (Inkson, et al., 2012). Furthermore, since seniority plays an important part in promotion in the IEC, and

since larger number of employees attend universities before accepting a job offer (Davis & Bauman, 2008), they start their career about ten years older than employees who haven't attended universities and might risk their promotion due to this age and seniority difference.

What is promotion

Promotion may be divided into several categories, such as position upgrade, taking over former supervisor's position, promotion to higher level position in a different section, being chosen to fill newly created position with greater responsibilities, promoted after reorganization, promoted but essentially continuing doing the same thing as before and more (Pergamit and Veum. 1999) the IEC have more than four hundred job definitions. All of those job definitions may be divided into seven groups. For purposes of convenience, these groups where referred as promotion categories starting from one to seven. An employee may start his career with a promotion category of one but some start at better categories, sometimes even starting with category seven from day one.

Theoretical background

Research questions:

The research question is whether the education plays an effect on job promotion within the IEC and to what extent.

Hypothesis: Education has a positive impact on job promotion in the IEC both on the average and on the highest status levels.

Methods

Sample and procedures:

The research is based on my thesis, in which a sample of 204 employees, 172 males and 32 females, filled a questionnaire regarding promotion and the independent variables researched. The method used was applying exploratory factor analysis to examine the independent variables on job promotion, Pearson Correlation as well as least square, linear regression analysis. It is important to mention at the outset that the indicators measured in this study do not reveal any range restriction or systematic missing values.

Variables:

The research tested two dependent variables while Education was an independent variable.

Dependent Variable I**:** called TimeMonths, Is the length of the period of promotion from previous status to a worker's current status (I.E. the number of months that took an employee to be promoted from a previous status A to the current status B).

Dependent Variable II: called Senior12Promotion, is the average number of months that took a worker at the IEC to be promoted from one status into the next over his/her entire career. This variable is calculated as the number of years of working at the IEC multiplied by 12 (months) and divided by a worker current status: (Tenure*12)/Status.

Results

The research hypothesis verified. The Education variable was confirmed as an important one regarding the promotion in the IEC. It is clear from Table 1 that the variable of Education is significant and the coefficient has a negative value, which means that it is inversely related to the duration of promotion from one status into the next, measured in terms of the number of months. In other words, the variable of Education is positively related to job promotion, as it shortens the duration period. From the Squared Multiple R variable, the research results show that these background variables provide no more than eight percent explanation of the variations in the dependent variable.

Table 1: Background Variable

Regression Coefficients B = $(X'X)^{-1}X'Y$						
Effect	Coefficient	Standard Error	Std. Coefficient	Tolerance	t	p-value
Education	-12.147	3.147	-0.268	0.960	-3.860	0.000

Dependent Variable	TimeMonths
N	204
Multiple R	0.285
Squared Multiple R	0.081
Adjusted Squared Multiple R	0.063
Standard Error of Estimate	46.203

Examining the first independent variable, the time it took the employee to reach his highest status level, as shown on table 2, The research indicates that variable of Education is significant and strong and any higher education degree causes reduction of the amount of time for promotion by almost eleven percent. When the second independent variable is tested, which measures the average promotion progression if the employee, table 3, it shows that the variable of Education continues to have the same expected negative sign, yet it is less significant. So the results indicate that there is a contribution to the education on promotion in the IEC, it is less shown on the average, but the effect of the higher promotion levels is dramatically.

Table 2: Extroversion: Dependent Variable: TimeMonths

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
	Edu	-10.920	3.267	-.242	-3.342	.001
a. Dependent Variable: TimeMonths						

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.271	.073	.035	46.80496

Table 3: Extroversion: Dependent Variable: Senior12Promotion

Model		Unstandardized Coefficients		Standardized Co-efficients	T	Sig.
		B	Std. Error	Beta		
	Education	-1.326	2.179	-.045	-.609	.543
a. Dependent Variable: Senior12Promotion						

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.384	.148	-.149	46.82637

Discussion and conclusions

Theoretical contributions

While it might have been debated whether the education plays a role in the decision of promotion in the IEC. The research results indicated clearly that there is a role, and further than just a role, it is a major role for promotion in the IEC.

Managerial implications

Managers in the IEC might want to invest in employees who started their career in the IEC with a higher education levels, and should take notice of other employees who study for such degrees during their employment period. As these are the employees who have a better chance of getting promoted.

Future Research

It seems fit to test the same theory on other government owned businesses and to establish a theory all over the public sector. Then, the same study should be performed on the private sector to see if there is a difference in effect of the education on the status of the employees.

References

Brink, A.G., Strand Norman, C., Wier, B.
2016
Attained Education and Promotion in Public Accounting. Issues in Accounting Education: August 2016, Vol. 31, No. 3, pp. 301-320.
Cavazotte, F., V. Moreno and M. Hickmann
2012
"Effects of leader intelligence, personality and emotional intelligence on transformational leadership and managerial performance." The Leadership Quarterly 23(3): 443-455.
Davis, J. W., & Bauman, K. J.
2008
School enrolment in the United States: 2006. Washington, DC: U.S. Census Bureau.
Inkson, K., Ganesh, S., Roper, J., & Gunz, H. P.
2012
Boundaryless careers: Bringing back boundaries. Organization Studies. 33, 323-340.
Michael R. Pergamit and Jonathan R. Veum
1999
“What is a Promotion?” Industrial and Labor Relations Review, Vol. 52, No. 4 (Jul., 1999), pp. 581-601
Stahl, G., C. H. Chua, P. Caligiuri, J. L. Cerdin and M. Taniguchi
2009
"Predictors of turnover intentions in learning-driven and demand-driven international assignments: The role of repatriation concerns, satisfaction with company support, and perceived career advancement opportunities." Human Resource Management 48(1): 89-109.

STREAMLINE THE BANQUETING SECTOR OF THE HOSPITALITY INDUSTRY

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Abstract

Purpose *– The paper will be directed towards the qualitative and quantitative bettering of raw materials, through the analysis of technological losses, resulted by preliminary processing and conventional thermal treatment, owed to the reduction of lipo-soluble and hydro-soluble substances.*

Methodology/approach *– Raw materials have been processed by using professional equipment for thermal treatment (induction stove, convection oven, salamander) and cooling (blast chiller), and also metrological approved instruments for measuring and control.*

Findings *– The energetic value differs according to the type of the raw material used, its quality but also according to the type of thermal treatment used. During the process of thermat treatment the raw materials change to a superior quality.*

Research limitations/implications *– The paper will be directed towards the qualitative and quantitative bettering of raw materials, through the analysis of technological losses, resulted by preliminary processing and conventional thermal treatment.*

Practical implications *– In this case study we determine the caloric equivalent for the: perch fillet, beef tenderloin and duck breast when raw and after undergoing conventional thermal treatments (water boiling, steam boiling and convective cooking).*

Originality/value *– By applying these techniques one can visualize, analyze and promote modern forms of great productivity in preparing assortments of products, as well as ensuring through menus with the requirements of the hospitality industry.*

Key words: *energy efficiency, specific consumption, nutritive value.*

Introduction

One of the biggest challenges of all times for a company is to achieve performance. This term has a wide interpretation, from financial performance to innovation performance or social responsibility performance. Each company chooses its path to performance by defining its mission, strategic objectives and by improving its internal processes to achieve performance (Rusaneanu, 2013).

The energy efficiency of products and the processes must be a major concern for the managers. The profit must be an incentive in the execution of the production program, as well as the improvement of the quality and the diversification of the brand. The structure of the offer must base itself on the correct association of products, rational order of the products, their adequate association to the drinks selection as well as ensuring the requirements regarding the satiety potency, seasonality and variety.

The paper will be directed towards the qualitative and quantitative bettering of raw materials, through the analysis of technological losses, resulted by preliminary processing and conventional thermal treatment. In this case study we determine the caloric equivalent for the: perch fillet, beef tenderloin and duck breast when raw and after undergoing conventional thermal treatments (water boiling, steam boiling and convective cooking).

By applying these techniques one can visualize, analyze and promote modern forms of great productivity in preparing assortments of products, as well as ensuring through menus with the requirements of the hospitality industry.

The Banqueting (conferences and banquets) defines an important activity in the hospitality industry, in a continuous development. It is about the internal meetings between members of an organization, the meetings with suppliers, customers or other business meetings, training courses, reaching up to congress. Aren't rare no press conferences, private actions, etc. The structures of receipt with running the accommodation is the ideal place for this kind of events, because, in addition to the specific services offers a combination of benefits typical hotel booking, which complement, accommodation and subsistence expenses, forming a coherent product of organization of events.

The determination of the consumptions is obtained through the production recipes, named „New/modified product chart". These contain the name of the products, raw materials, gross quantity needed, unitary weight, technological process (preliminary operations, preparation technique, presentation and serving mode), including the loss coefficients. According to the loss coefficients of raw materials, one can estimate the weight of the final product of the prepared food without actually weighing it. According to the acquisition price of the raw materials and the quantities used in the recipes, the systems automatically calculate the price of the final product (Pasca et al., 2016).

The structure of the offer must base itself on the correct association of products, rational order of the products, their adequate association to the drinks selection as well as ensuring the requirements regarding the satiety potency, seasonality and variety (Berechet, 2004).

The art of composing a menu, the harmonious selection of raw materials, their blending with the drinks (according to the clients' preferences), by highlighting the gastronomical specialties (house's/chef's specialty) needs plenty of experience in the hospitality industry (Gauthier et al., 1994).

Work method

Raw materials have been processed by using professional equipment for thermal treatment induction stove, convection oven, salamander and cooling blast chiller, and also metrological approved instruments for measuring and control. The menu includes of perch fillet noted as F^A, F^B, F^C, F^D , beef tenderloin noted as B^A, B^B, B^C, B^D and duck breast noted as T^A, T^B, T^C, T^D. The work method regarding the caloric equivalent is applied through samples of the obtained products, determining the protein content, Kjeldahl analysis system, fat the SR EN ISO1443/2008 method, standard, which specifies a reference method for determining the total percentage of fat in meat and meat-based products) and carbohydrates SR EN ISO1737/2001method, through the hot reduction of the alkaline solution, with the help of the reducing sugar content (Good Practice Guide in the lab., 2006).

The nutritive value of food is given by proteins, which represent basic components. The quality of food products is emphasized mainly by their protein content. Proteins from meat have a content of nitrogen with a relatively constant value, 100 g of proteins containing about 16 g of nitrogen. Thus, one can determine the quantity of proteins by knowing the nitrogen content, with the help of a conversion index of 6.25 (deducted from the correlation: 100/16). The method regarding the determination of proteins is realized through the nitrogen content from the analyzed product. The determining of the total nitrogen and its conversion in its protein equivalent is realized through the multiplication factor and taking into account an error coefficient (the nitrogen derived from adjuvants: nitrates and nitrites).

Technological losses

Specific consumption includes the losses during the manufacturing flow that can relate to the total raw materials involved, the total production achieved or the product. CS-specific consumption is defined as the ratio of the quantity of raw materials used and the quantity of the finished product (Stavrositu, 2008).

Preliminary processes take place at a controlled temperature (T) of maximum 10^0C. Raw materials noted with A (raw product) are weighed according to gross quantities (CB) listed in the data sheet for new/modified product, kg, for 10 portions.

Thermal treatments monitored during the technological process are water boiling-B, steam boiling-C and cooking in the convection oven-D, used on different types of raw materials perch fillet, beef tenderloin, duck breast at a processing temperature situated between 102^0C-220^0C and the duration of the technological process is comprised between 40 and 70 minutes.

Table 1. Characteristics of the technological process of products.

Technologica process		Final products											
		F^A	F^B	F^C	F^D	B^A	B^B	B^C	B^D	T^A	T^B	T^C	T^D
Preliminary process	CB 10 portions	2.7	2.7	2.7	2.7	1.8	1.8	1.8	1.8	1.4	1.4	1.4	1.4
	T °C	10	10	10	10	10	10	10	10	10	10	10	10
Thermal treatment	Processing type	-	B	C	D	-	B	C	D	-	B	C	D
	T °C	-	102	140	180	-	102	160	220	-	102	150	210
	Duration (')	-	45	40	45	-	75	50	50	-	60	50	50
Cooling 4°C	Duration (')	-	100	120	120	-	120	120	120	-	120	120	120

The perch fillet is cleaned of the remaining bones from the filleting process and scales, resulting a loss of 60 g, respectively 22 percent, and the beef tenderloin is trimmed, resulting a loss of 15 g, respectively 8 percent, the duck breast is trimmed and cut, resulting a loss of 14 g, respectively 10 percent.

Table 2. Technological losses through preliminary processing.

Preliminary processing	Final products											
	F^A	F^B	F^C	F^D	B^A	B^B	B^C	B^D	T^A	T^B	T^C	T^D
CB	270	270	270	270	180	180	180	180	140	140	140	140
Loss (g)	60	60	60	60	15	15	15	15	14	14	14	14
Loss (%)	22	22	22	22	8	8	8	8	10	10	10	10
Final quantity	210	210	210	210	165	165	165	165	126	126	126	126

During the technological process there are quantitative losses, due to the losses of lipo-soluble and hydro-soluble substance, all different according to the thermal treatment.The perch fillet registers the largest mass loss through convective cooking 17 g, respectively 13 percent, the steam boiling under pressure being situated at an average level of 13 g, respectively 10 percent, and the best type of cooking is water boiling, with a loss of 12 g, respectively 9 percent. For the beef tenderloin the losses are 10 percent for steam boiling, 14 percent for water boiling and 16 percent for convective cooking.

The largest substance losses for duck breast are during convective cooking 17 g, percentage loss 13 percent, at the opposite end being water boiling 12 percent, respectively 9 percent, and the average level is registered during steam boiling 13 g, respectively 10 percent.The thermal treatment with the lowest efficiency is convective cooking, with mass losses of 13 percent to 18 percent.

Table 3. Technological losses through thermal treatment.

Thermal treatment	Final products											
	F^A	F^B	F^C	F^D	B^A	B^B	B^C	B^D	T^A	T^B	T^C	T^D
CI initial quantity	-	210	210	210	-	165	165	165	-	126	126	126
Loss (g)	-	30	28	38	-	24	33	27	-	12	13	17
Loss (%)	-	14	13	18	-	14	10	16	-	9	10	13
Final quantity	-	180	182	172	-	141	132	138	-	114	113	109

The products are cooled in a controlled environment (the parameters monitored being time and temperature) in order to avoid the loss of nutritive substances and nutriments through the microbiological and physical-chemical changes that take place naturally. The processed products are cooled for 4 hours from the temperature of 63^0C to 20^0C, with substance losses situated between 7 percent and 12 percent, and for maximum 2 hours from 20^0C to 4^0C, with substance losses of 4% to 9 percent.

The dynamics of technological losses, registered through this process, is between 6 percent and 12 percent for the perch fillet, between 4 percent and 12 percent for the beef tenderloin and between 5 percent and 10 percent for the duck breast. Regarding the raw materials analyzed, the perch fillet is situated at the maximum level of 12% mass loss, and at the opposite end the beef tenderloin with a mass loss of 4 percent, through the cooling of the product from 20^0C to 4^0C.

Table 4. Technological losses through controlled cooling 63°C to 20°C.

Cooling 63^0C la 20^0C	Final products											
	F^A	F^B	F^C	F^D	B^A	B^B	B^C	B^D	T^A	T^B	T^C	T^D
CI-initial quantity	-	180	182	172	-	141	132	138	-	114	113	109
Loss (g)	-	22	13	16	-	10	12	17	-	12	10	9
Loss (%)	-	12	7	9	-	7	9	12	-	10	8	8
Final quantity	-	158	169	156	-	131	120	121	-	102	103	100

Table 5. Technological losses through controlled cooling 20°C to 4°C.

Cooling 20^0C la 4^0C	Final products											
	F^A	F^B	F^C	F^D	B^A	B^B	B^C	B^D	T^A	T^B	T^C	T^D
CI initial quantity	-	158	169	156	-	131	120	121	-	102	103	100
Loss (g)	-	10	12	15	-	10	5	10	-	6	10	9
Loss (%)	-	6	7	9	-	7	4	8	-	5	9	9
Final quantity	-	148	157	141	-	121	115	111	-	106	93	101

During thermal treatment, for water boiling losses are of 45 percent at the perch fillet, 31 percent at the beef tenderloin and 29 percent at the duck breast. Steam boiling causes losses of 46 percent for the perch fillet, 35 percent for the beef tenderloin and 35 percent for the duck breast. The highest values of losses are observed during convective cooking 47 percent, and the lowest values are at water boiling 29 percent, due to the quantity of water which evaporates and is lost, but part of the water is found in the tray used for thermal processing.

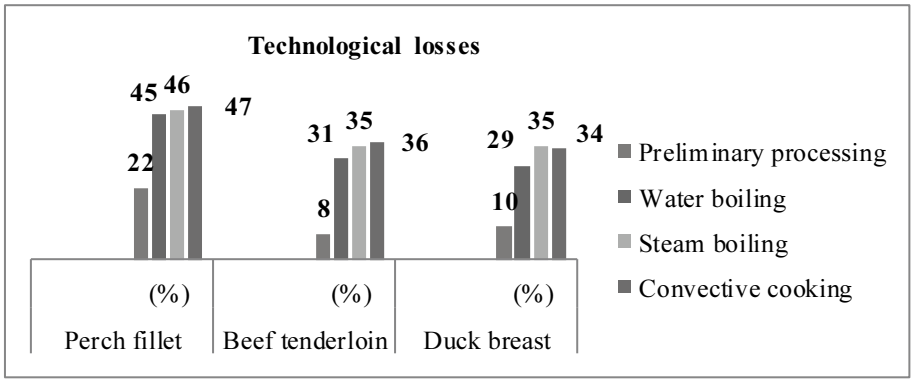

Figure 1. Technological losses accoring to technological process.

Determination of energetic value

The energetic value of a product is calculated based on the caloric equivalent of its components and is expressed in calories per product gram. The energetic value has the following values: P- proteins 4.1 calories/gram, L-fats 9.3 calories/gram, G-carbohydrates 4.1 calories/gram. The estimate of the nutritive value is done for 100 g/culinary product, facilitating the quantitative determination, grams per portion, as well as the estimation of nutritive substances and total calories/menu, with the verification of them being within range of daily necessities (Berechet, 2004).

Thus differentiate menus according to season can be made, taking into consideration the fact that the physiologic necessary of the human organism is influenced by weather conditions. The normal content of proteins during warm seasons is 13-16 percent, carbohydrates – an increased consumption up to 55-65 percent and fats – a low consumption of 20-30 percent. During the summer season one will avoid foods rich in fats when assembling menus, but will add products made from fresh fruits and vegetables, which are important sources of vitamins and mineral salts. During the cold season the

organism needs an increased amount of calories, so menus will include foods rich in fats 35-40 percent, especially animal origin fat, carbohydrates 55 percent, and also a normal intake of proteins 13-14 percent, of which 60 percent of animal origin.

In the structure of the menu one must include seasonal commodities, the menus must be diverse as well as from the preparation technique point of view as for the presentation and serving point of view, avoiding products that share the same technological process, components, taste, colour (Ferrat, 1996).

In this case study we determine the caloric equivalent for the: perch fillet, beef tenderloin and duck breast when raw and after undergoing conventional thermal treatments: water boiling, steam boiling and convective cooking. The energetic value differs according to the type of the raw material used, its quality but also according to the type of thermal treatment used. During the process of thermat treatment the raw materials change to a superior quality, the obtained product has exquisite organoleptic qualities, but they also undergo physical, chemical and biological changes which may have undesirable effects.

At high temperatures and during long processing durations toxic elements are produced, the nutritive values are diminished through the destruction of nutrients. The elevated content of carbohydrates and starch from the culinary products, through cooking and as a result of the undergone changes, lead to the emergence of the chemical product called acrylamide, with a marked carcinogen effect (Erikson, 2005).

In the case of long duration thermal process proteins go through a stage of degradation by the decrease of amino acids, decrease of metabolic potential, reduced solubility. At temperatures over 200^0C carbohydrates degenerate qualitatively and produce toxic components (Shapton et al., 2008).

Discussion and conclusions

The values registered for the perch fillet are between 216,74 kcal/100 g after water boiling and 236,59 kcal/100 g after convective cooking, for the beef tenderloin between 252,20 kcal/100 g after steam boiling and 286,75 kcal/100 g after convective cooking, for the duck breast between 263,68 kcal/100 g after steam boiling and 266,06 kcal/100 g after convective cooking.

Table 6. Caloric equivalent, caloric and nutritive value

Raw materials	Caloric equivalent g/ 100 g product			Energetic value	
	P	L	G	kcal/100 g	kcal/portion
F^A	12.31	13.25	1.71	180.71	379.49
F^B	17.20	15.26	1.05	216.74	320.77
F^C	18.92	16.26	1.23	233.83	367.11
F^D	19.43	16.23	1.46	236.59	333.59
B^A	13.88	15.33	1.13	204.11	336.78
B^B	19.00	19.22	1.22	261.65	316.59
B^C	18.50	18.46	1.14	252.20	302.64
B^D	19.78	21.20	2.07	286.75	318.29
T^A	15.66	14.50	2.88	210.86	246.70
T^B	18.00	19.22	3.18	265.58	281.51
T^C	19.22	18.46	3.22	263.68	245.22
T^D	21.30	17.42	4.08	266.06	282.02

Specific consumption and technological losses represent the ratio between the quantities of raw edible materials in the rough, used in the structure of the recipes, and after all technological operations, results the quantity of the finished product, reported to the resulted quantity of consumption products. Specific consumption results starting from weighing raw material/measurement in rough, weighing again after primary deduction, assembling thermal treatments water boiling-B, steam boiling-C and cooking in the convection oven-D, weighing the finished product.

The determining of the caloric equivalent by using samples of the products, with laboratory methods for obtaining the protein content through the Kjeldahl analysis system, carbohydrates content SR EN ISO1443/2008 method and fats content SR EN ISO1737/2001 method, offers users information which allows them to draw up their product sheets in order to satisfy their alimentary necessary.

The measurement of a company's performance using customer satisfaction is quite obvious today. Unlike financial reporting, customer satisfaction related metrics can indicate a future performance. The customer's perspective is an essential component for future predictions. The financial perspective is a traditional component and it is necessary in any performance management system. Relevant and actual financial information is always useful for a company, but not sufficient in order to determine the overall performance of a company and to assure the alignment between strategies and actions.

The superior quality of the products obtained by professionals by using modern technology as well as scientifically elaborated cookery books, the accessibility of the prices for a wide variety of menus attract a continually growing category of consumers.

The management and control system can offer the possibility of drawing up the desired menus, as well as selecting products suitable for vegetarians, children but also for people with different food allergies. The superior quality of the products obtained by professionals by using modern technology as well as scientifically elaborated cookery books, the accessibility of the prices for a wide variety of menus attract a continually growing category of consumers.

As a future research direction the configuration of a software for the management and control system for the units in the industry of hospitality through which the final quantity of the products can be determined, taking into account technological losses after preparatory processes and the preparation technique, realized with the help of modern equipments of thermal treatment and controlled cooling of raw materials.

References

Berechet, G., Cojocariu, S., Florea, C., Lăscuţ, R., Nica, L. Tincă-Niţă, C. and Toma, C.
2004
The manager of the restaurant (in Romanian), 202-207, Bucureşti.
Erikson, E.H.
2005
Acrylamide in food products: Identification, formation and analytical methodology, Doctoral thesis, Stockholm University.
Ferret, C.
1996
Savoirs et technique de restaurant, Editions B.P.I., Paris.
Gauthier, J.P., and Payant, T.
1994
L'art de la table. Decoupage. Flambage. Presentation. Edition Jacques Lanore. Paris.
Pasca Pascariu, G. and Mărăscu-Klein, V.
2016
Specific Consumption Efficiency in Tourism Industry. Recent Journal 17: 577-585, Transilvania University of Brasov
Rusaneanu, A.
2013
Comparative Analysis of the Main Business Intelligence Solutions.
General Business Journals, Vol.17, No.2
Shapton, D.A., Lovelock, D.W. and Longo, R.L.
2008
Journal of Applied Microbiology, 34: 490-500.
Stavrositu, S.
2008
The art of services in restaurants and bars, culinary technology, hotel services (in Romanian). Fundaţia Arta serviciilor în turism prof. Stere Stavrositu, Constanţa.

IMPROVING PERFORMANCE BY REDUCING HUMAN INVOLVEMENT IN MANAGING ONLINE STORES

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Abstract

Purpose *– The purpose of this study is to find which processes can be automatized and how can be increased the performance of an online store while increasing the quality of selected processes and reducing the human error rate.*

Methodology/approach *– The methodology of the current study is based on a qualitative analysis, gathering feedback of local ecommerce entrepreneurs which are managed in an online store in 2017.*

Open Findings *– Some of the findings are needed in some particular business models and can't be used most of the reviewed business models. Some of the business owners don't demand this kind of optimizations because they didn't know that it is possible.*

Research limitations/implications *– The current research is limited to local ecommerce entrepreneurs from Romania, but it can be extended worldwide.*

Practical implications *– The implications can improve repetitive processes and reduce worked time to dispatch an order. Employees of many online stores can do every day more valuable tasks and companies can reduce costs.*

Originality/value *– The approach of understanding common processes of different kind of business models based on different ecommerce platforms.*

Keywords: *Ecommerce industry, online business model, process automatization*

Introduction

This paper examines the role of data transfer between internal and external apps of ecommerce companies which need to process data faster for having an efficient activity in order to succeed. We argue that in the actual market there is an increasing need to eliminate many manual tasks made by employees of each company for reducing the costs and increasing the competitivity of each company. The objective of the current study is to identify which are the usual tasks that the persons who manage an online store are doing every day in order to process an order and to deliver the products. For improving the competitiveness, productivity, profit and creating new jobs, each company needs in the actual economy to do more using less resources.

Automatization and making the interaction between software and humans faster can help any organization to have an efficient activity. Because the increasing popularity of open source apps and a big availability of APIs (application interface protocol), every developer has a large amount of work for integrating a business with many app. Clark Steven considers that application programming interfaces make it easier for developers to use certain technologies in building applications (Anon., 2014) (Anon., 2014). The research problem is to understand the business model of ecommerce processes for finding a solution of faster and easier integration, with less resources. As we know, for every big change of paradigm we have a resistance from employees. Pantaleo Atambo and Dr. Paul Katuse discovered challenges on automation strategy because of the high resistance from staff and limited training when they adopted a new Enterprise Resource Planning software system (Atambo & Katuse, 2017).

Zaref et. al mention that the emergence of ecommerce has revolutionized the manner in which firms could conduct business with customers by eliminating spatial and temporal barriers. However, the personal information that customers are often required to disclose poses a threat to individuals' information privacy (Zaref & Gurvirender, 2016). Alexandros Kaliontzoglou et. al consider that for e-invoicing to become part of the financial and legal practices of an organization, it is important that it satisfies strict security requirements and legal practices of an organization. The majority of these requirements is imposed by the Directive 2001/115/EC and includes authentication of the origin, integrity of content, non-repudiation of origin and receipt, confidentiality and privacy, integrity of sequence, availability, electronic storage and e-invoicing application security policy (Kaliontzoglou, et al., 2006).

Abdulai Mahmoud et. made a research for finding how can be improved the experience of customers. It was found that firms are better positioned if they have consumers' top of the mind consideration to continuously repurchase their products and services. This infers that service firms must invest wisely and co-ordinate their service innovation activities well, so as to deliver outstanding innovative services that provide satisfaction to customers. This will enable companies to gain consumers' top of the mind consideration to build and enhance loyalty (Mahmoud, et al., 2017).

Materials and methods

Considering the privacy and the need for automation the research was centered on discovering which are the needs of SME managers and also self-employed individuals who manage every day at least one online store. The current study had the objective to reduce the time allocated for making different type of papers for delivering an order. This approach requests information and feedback of business owners. For obtaining relevant conclusion, all results will be analyzed for determining the efficiency of eliminating manual tasks from the usual activity of an ecommerce store. Noémie Dominguez considers that qualitative research is attractive for several reasons: it is rich, whole, accurate, holistic; its validity seems irreproachable, it preserves the timing when necessary and only slightly suffers retrospective distortions; and it offers, in principle, a much more specific way to assess the links in the organizations than the correlations in chains (Noémie, 2018). The qualitative research was chosen for having a real opinion and valuable details in order to identify solutions for reducing number of actions that an employ has to make for processing online orders.

Interviews with the SME managers were used as the primary source of feedback using a focused interview for finding their best solutions. Focused interview is a term that defines an interview predominantly with open questions about a specific situation or event that is relevant to them and interesting for the researcher (Merton, et al., 1956). All presented data were anonymized for privacy issues, the interview was made with the owner of each SME and also when needed validation with other internal/external public databases.

For this research 16 respondents replied, and were choose randomized from many ecommerce stores in the following categories: Electronics, Baby & Toys, Fashion, Beauty & Care and Food. The objectives of the focused interview were:

- To find out if the business managers know about the opportunities generated by automatization of software by linking many applications to work together.
- To understand which is the order volume through which the manager wishes to integrate automatizations in their business.
- Which are the most time-consuming activities when processing an online order.

For discovering which are the needs and how they can propose solutions for online stores, we made the focused interview in a way we can find the answers to ten important questions. We can observe the basic questions and also the importance of each one for the research.

Question 1 – Which type of products does the company sell frequently?

We need to know what segment of ecommerce we can list from each analyzed business.

Question 2 – Does the company use a local or cloud invoicing software?

For making performance we need to know if the company has a cloud based invoicing software or a local one. Also, we need to know if they use any software or the invoices in a text editor.

Question 3 – What kind of documents does the company generate for delivering an order?

Depending on the market where they sell the products and also on the specific activity, we need to know which documents are generated manually or automatic for every order.

Question 4 – How many delivery companies do they use to send the orders?

Online stores usually deliver the goods with specialized companies and sometimes they link to them for generating the delivery papers.

Question 5 – Does the company have automation for billing process?

Because this type of integration is very used in the latest years, the research has to identify if a business has the automatic processes it needs and also if the actual options are enough.

Question 6 – Does the company have automation for delivery process?

We suppose that some companies use a single delivery company and others can use more, because every transport company has advantages and disadvantages and we need to know how many they are. On a further research we can analyze if the delivery companies are prepared to link their system with the online stores.

Question 7 – Which is the strategy of the company for improving the sales process?

The sale process ends when the invoice is made, listening to the strategy of each business owner, the current study can identify where a company can make improvements for developing their business.

Question 8 – Does the company have problems finding specialized employees?

This question can tell us if the process automatization is needed and can reduce cost, maintaining a bigger volume orders with less employees.

Question 9 – How many orders do you receive per year?

Because the number of orders can vary from one business to another, our research had to observe how many orders each company has in one year. The study is including the number of orders from 2017.

Question 10 – Would you invest for implementing automatic processes of orders?

The attitude of every business owner is considered important because some of them don't know all the opportunities and others are resistant at changes. This type of questions can relay many other useful information for further researches.

The real interview had an average of discussion of 45 minutes and even if we focused on strategy and process automatizations, we received many other useful information for having an exact vision based on actual needs of SME.

With the obtained resource, a workflow of the process for delivering an order will be made, considering the feedback from each company. According to Paige Baltzan a workflow consists of an orchestrated or repeatable pattern of business activity, enabled by the systematic organization of resources into processes that transform materials, provide service, or process information. It can be depicted as a sequence of operations, declared as work of a person or group, an organization of staff, or one or more simple or complex mechanisms (Baltzan, 2016).

Results

The results of this research found that most of the online stores from our sample have similar process on the timeline, from the moment they receive the order confirmation until the products leave online stores inventory. Even if the study was made with SMEs from just sum market segments, we can estimate that many other online stores that are selling different products have the same workflow for delivering physical products. Our respondents were business managers and also self-employed. The number of declared received orders per year was between 42 and 9417. In table 1 we found out that all

of the companies generated invoices and delivered documents for being picked up by the delivery company.

Table 1 – Respondents of the interview, general status

Company	*Respondent position*	*Type of products sold*	*Number of orders in 2017*	*Type of documents generated per order*
A	Business manager	Baby & Toys	1079	Invoice, Delivery docs
B	Self Employed	Beauty & Care	500	Invoice, Delivery docs
C	Business manager	Fashion	2285	Invoice, Delivery docs
D	Business manager	Beauty & Care	40	Invoice, Delivery docs
E	Business manager	Fashion	1270	Invoice, Delivery docs, export documents
F	Business manager	Baby & Toys	3775	Invoice, Delivery docs
G	Business manager	Food	38	Invoice, Delivery docs
H	Business manager	Electronics	3147	Invoice, Delivery docs
I	Self Employed	Food	140	Invoice, Delivery docs, export documents
J	Business manager	Baby & Toys	9417	Invoice, Delivery docs
K	Business manager	Electronics	619	Invoice, Delivery docs
L	Business manager	Electronics	1207	Invoice, Delivery docs
M	Business manager	Electronics	1007	Invoice, Delivery docs
N	Business manager	Beauty & Care	1247	Invoice, Delivery docs, export documents
O	Business manager	Electronics	4913	Invoice, Delivery docs
P	Business manager	Electronics	3151	Invoice, Delivery docs

Table 2 contains details about invoicing software billing automation and the system they use to generate the delivery documents. Most of the respondents are using a billing software and, those who are not using them, use a document editor to make the invoices completely manual. Half of the analyzed companies don't have a billing automation and even if most of them are using more than a delivery company, most of them don't have a software for transferring the data between their system and the delivery company's system. For finding solutions we wanted to know if they want to increase the sales and it can be observed that all respondents are having a strategy of what they want to do for being more competitive. Also, it can be observed that just a few of them wanted to improve the performance of their systems. Most of the respondents are having a strategy for growing their business and they are not conscious about how much resources they spend because they don't invest in the process automatization.

Table 2 – Actual state of generating documents automatically

Company	*Invoicing software*	*Billing automation*	*Delivery companies*	*Automatization of delivery documents*	*Strategy for increasing sales*
A	Yes	Yes	2	No	Automation and advertising
B	Yes	Yes	2	Yes	More discount schemes
C	Yes	No	1	Yes	Advertising
D	Yes	No	1	No	Improving brand awareness
E	Yes	Yes	3	Yes	Reducing operating costs
F	Yes	No	2	Yes	Bigger products inventory, drop shipping
G	Yes	No	1	No	Increase market share
H	Yes	Yes	5	Yes	More satisfied customers
I	Yes	No	2	No	Better advertising
J	Yes	Yes	3	Yes	Bigger stocks
K	Yes	No	1	No	More partners
L	Yes	No	2	No	Advertising and faster processes for sales
M	No	Yes	3	No	Bigger inventory
N	No	Yes	3	No	Extend on international market
O	Yes	No	1	No	Better discounts
P	Yes	No	3	No	Extend on B2B automatic processes

For understanding the process for every order, we gathered the answers from each interview and made a workflow diagram presented in the figure 1. The figure represents the process that an online store makes for deliver the goods and also, they have different scenarios depending on the payment and delivery options, depending on the options they offer to their customers.

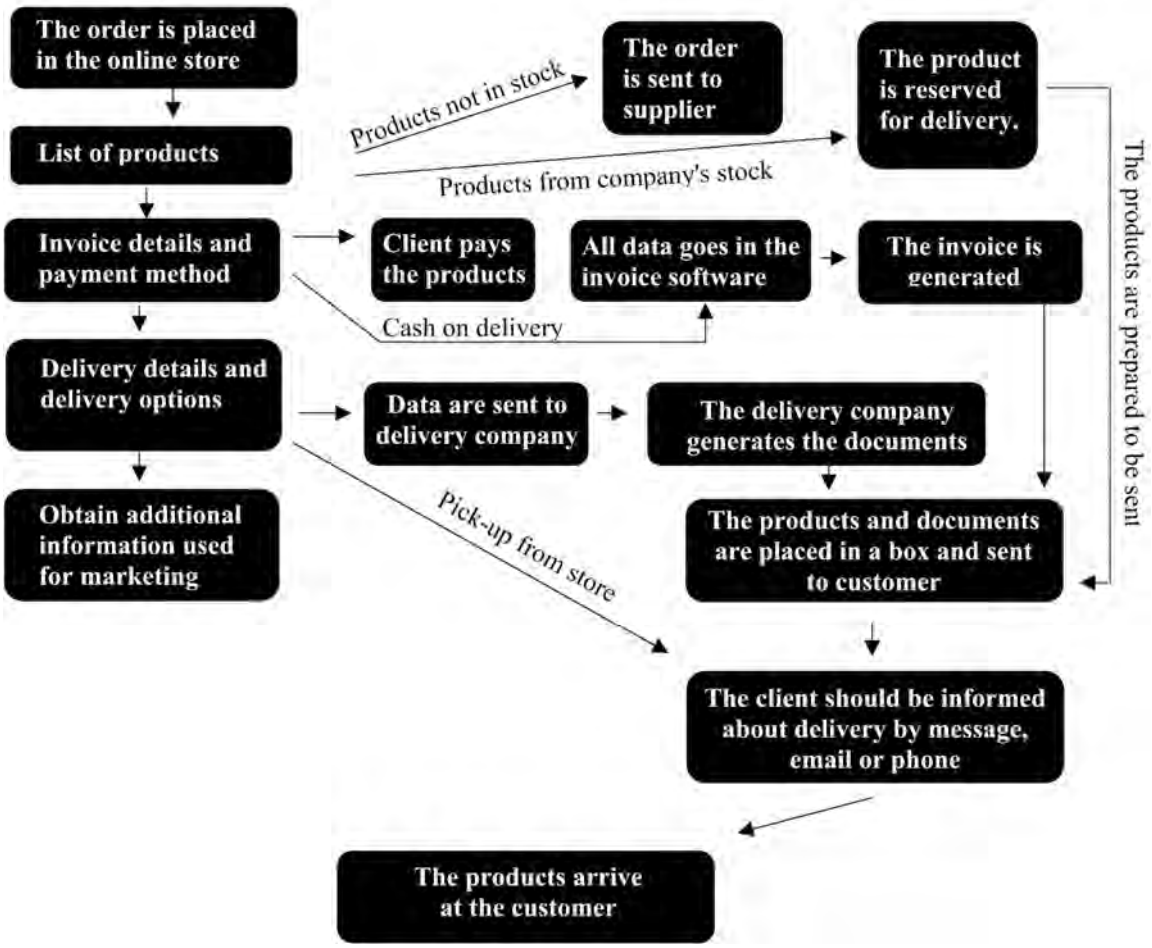

Figure 1 – Model for automatizing the data process in an online store

Discussion and conclusions

According to Eurostat detailed analysis of the contribution of various sectors to enterprise births in 2014 shows that in all Member States for which data was available, 'wholesale and retail trade' and 'professional, scientific and technical activities' are always among the five most important sectors (Muller, et al., 2017).

The actual research released some conclusion about the fact that most entrepreneurs wish to extend the business but even if they have a strategy and many plans to increase the sales, they don't pay a high attention on how they can increase the performance of employees using the actual technology. Even if the actual informatic systems can offer many options, the entrepreneurs have to pay attention on the long-term implications. Also, improving the performance should be an ongoing process, the advantage of those who are starting now is because after 25th of May 2017, all companies should comply with GDPR (General Data Protection Regulation). Paul Voigt and Axel von dem Bussche's approach mentions that each group or third-party entity will be accountable for its own data protection standards (Voigt & Von dem Bussche, 2017). For this reason, those who still don't have an automation system will not spend to adjust the systems according to GDPR. Jean-Pierre Chamoux's opinion is that IT services have slipped into the heart of the economic activities they were being absorbed by without actually changing the essentials of careers (Chamoux, 2018) and this could be the reason to improve efficiency for having a good rating when comparing to competition.

Steiber and Alänge believe that IT-related areas such as software, electronics, telecom, e-commerce, social media and mobile technologies create the need for innovation and constant change as technology changes rapidly while building flexible and adaptable organizations fast (Steiber & Sverker, 2016). This need of innovation can push all companies to be more efficient in the actual economy.

For all these changes, the learning process should be included in each discussion, a recent study concluded that an organization that provides its employees with training has increased the possibilities to accomplish a successful implementation of e-business processes (Maditinos, et al., 2014). Therefore, each business manager has to learn constantly and improve his business in order to reduce the cost and to be competitive in the actual economy.

References

Atambo, P. & Katuse, P.
2017
Challenges in the implementation of the business automation project at Kenya Revenue Authority (KRA). *European Journal of Business and Startegic Management,* 2(4), pp. 89-116.

Baltzan, P.
2016
Business Drive Technology. s.l.:Cram 101 Textbook Reviews.

Chamoux, J. P.
2018
The Digital Era 1 - Big Data Stakes. s.l.:Wiley.

Clarke, S.
2014
Measuring API Usability. [Online]
Available at: http://www.drdobbs.com/windows/measuring-api-usability/184405654 [Accessed 19.07.2018].

Kaliontzoglou, A., Boutsi, P. & Polemi, D.
2006
eInvoke: Secure e-Invoicing based on web services. *Electronic Commerce Research,* 6(3-4), p. 337–353.

Maditinos, D., Chatzoudes, D. & Sarigiannidis, L.
2014
Factors affecting e-business successful implementation. *International Journal of Commerce and Management,* Volume Vol. 24 Iss 4 pp, pp. 300-320.

Mahmoud, A. M., Hinson, R. E. & Anim, P. A.
2017
Service innovation and customer satisfaction: the role of customer value creation. *European Journal of Innovation Management.*

Merton, R. K., Fiske, M. & Kendall, P. L.
1956
The Focused Interview. s.l.:The Free Press.

Muller, P. et al.
2017.
Annual report on european SMEs 2016/2017

Noémie, D.
2018.
SME Internalization Strategies, Innovation to Conquer New Markets. s.l.:Wiley.

Steiber, A. & Sverker, A.
2016.
The Silicon Valley Model, Management for Entrepreneurship. s.l.:Springer.

Voigt, P. & Von dem Bussche, A.
2017
The EU General Data Protection Regulation (GDPR). s.l.:Springer.

Zaref, M. A. & Gurvirender, P. T.
2016
Examining Privacy Concerns and Ecommerce Adoption in Developing Countries: The Impact of Culture in Shaping Individuals' Perceptions Towards Technology. *Computers & Security.*

MANAGEMENT IMPACT ON MANAGERIAL PERFORMANCE

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Abstract

Purpose *– The aim of the research was to obtain a ranking of the technical universities in Romania according to the existing national and international data.*

Methodology/approach *- Several criteria have been used to assess performance both at national and international level. Subsequently, a ranking of universities was made according to the score obtained.*

Findings *– Following the analysis, we obtained an appreciation of the university's level of performance according to national and international criteria.*

Research limitations/implications *–The study did not allow us to measure the level of knowledge of the managerial performance of universities through the perspective of the future student or the graduate, because at national level there are no independent studies for technical universities.*

Practical implications *– By knowing the location of each technical university, one can identify the strengths and weaknesses of each university, and take steps to improve.*

Originality/value *– The study allowed the identification of performance measurement criteria and knowledge of the level obtained separately for each individual and global criterion according to published data.*

Key words: *Performance management, Management team, Managerial actions*

Introduction

The constant evolution of society, the need for progress and knowledge led to a rapid pace of change in the sphere of education as well. Thus, it is believed that mankind needs a common consciousness able to promote a new trend based not only on moral and social values but also on technological change, progress and adaptability and continuous education. Efforts to achieve a common European framework are continuing, with European specialists considering that there is a low graduation rate in Romania, recommending the increase of skills among adults and the development of lifelong learning programs (Official Journal of the European Union, 2011, 2012 and 2017). Thus, in order to have competencies among young people or adults, it is necessary to develop competences among teachers, which then allow the transfer of knowledge, access to information, the ability to synthesize and put into practice, and ultimately the possession of knowledge and the obtaining of performance. Performance at the level of university education is a widely discussed topic in all countries of the world, with quantitative and qualitative indicators being developed to allow for measurement and monitoring (Cave et al., 1988, Melo et al., 2010, Bogt et al., 2012). In many countries, state funding for universities is based on performance criteria (research and teaching), with higher education being considered a strategic sector because of its long-term role of generating learning capable of determining development (McCormack , 2013; Goodall 2006). There are also private investments that are directed at universities as a result of their involvement in research, the development of areas close to the technological frontier or cooperation in certain joint projects of interest (Goodall, 2009a). Going beyond the importance of obtaining the necessary resources, universities are increasingly confronted with strong competition, not only on the national market but also on the global market in terms of both the student market and the labor market, that performance level needs to be measured both to make a correct selection and to identify differences where they exist (Kagioglou et al., 2001; Melo et al., 2010).

The success and competitiveness of organizations is also a topic of interest, which is found in many studies, being closely linked to the performance of the employees and depending on how managers understand to stimulate and develop their skills, creativity and team spirit (Campbell et all, 1998; Chen et al., 2004; Byron et al., 2012). Thus, numerous studies demonstrate that there is a positive effect that results in increased individual performance when applying the pay-for-performance principle (Jenkins et al, 1998, Prendergast, 1999, Atkinson et al 2009, Gielen et al., 2015).

Government control is another issue that, depending on the policy of each country, increases or decreases the level of autonomy of universities and, implicitly, the level of development and involvement, and these effects are found later in the performance (Acemoglu, 2006, Aghion et al., 2010). Also, the managerial team's competence, motivation and leadership skills are topics discussed, resulting from studies that when promoting employee performance this should be correlated with rewards, with positive impact according to the associated importance (Zhang et al., 2010; Scott et al., 1994; Hirst et al., 2009).

Material and method

The study involves an analysis of the university performance in terms of the evolution of the number of students and the level of funding. In the first part there was an analysis of the 4 state universities with technical profile from the 4 large university centers in Romania, according to data published by CNFIS. (National Council for the Financing of Higher Education). In the analysis included as variables: the number of existing students according to the allocated places (budget, fee and total), the number of students according to the type of studies (license, master and doctorate) and the level of financing received from the state budget . This analysis was carried out for a period of 6 years and started from the selection of the technical universities in Romania, and then the grouping of four university centers and the comparison both in quantitative terms (by the number of students) and qualitatively. Thus, in Romania, the size of financing is set by CNFIS and includes a part that is determined by the number of students (quantitative) and another part according to quality indicators designed to measure managerial competencies and those of the teaching staff (qualitative).

Thus, the generic name of the Technical University of Bucharest was given for the ease of study and was obtained by aggregating the data from the three technical universities in Bucharest: Politehnica University of Bucharest, Technical University of Civil Engineering and Ion Mincu University of Architecture and Urban Planning. The following three universities were also included in the study: the Technical University of Cluj-Napoca (UTCN), the "Gheorghe Asachi" Technical University of Iasi (UTI) and the Polytechnic University of Timisoara (UPT).

The second part of the study involves an analysis of technical universities in Romania according to indicators used by specialized institutions at international level, which are presented in Table 1.

Table 1. Criteria for classifying universities

Crt. no.	Name of indicators	UPB	UTCN	UTI	UPT	UTCB	UAUIMB
1	Presence Rank	3449	1959	2384	2477	6631	6886
2	Impact Rank	3162	2446	2623	3373	7633	7609
3	Openness Rank	2021	1787	1668	1804	4020	6757
4	Excellence Rank	783	1614	1636	1819	4696	5777
5	World Rank (5=1÷ 4)	1251	1565	1614	1838	4620	6924
6	Academic Reputation	51.8	18.9	30.5	15.4	-	-
7	Employer Reputation	60.4	17.3	40.6	23.6	-	-
8	H-index Citations	51.1	-	-	-	-	-
9	Citations per Paper	-	40.7	51.8	40.5	-	-
10	Web Impact	62.9	50.7	46	35.8	-	-
11	Papers per Faculty	-	70.4	98.3	96.2	-	-
12	QS University ranking (EECA) (12=6÷11)	109	128	88	121	-	-
13	Best Global Universities Rankings	730	1111	1140	-	-	-
14	Country rank	2	6	7	10	22	25
15	World rank	1212	2094	2367	2919	5696	5780

1-5 by www.webometrics.info; 6-12 by www.topuniversities.com; 13 by www.mastersportal.com; 14-15 by www.4icu.org.

Thus, according to the data presented by "webometrics", the "Presence rank" indicator was calculated taking into account the "google" data source, the values being obtained as a result of the university dimension according to the web domain (www.webometrics.info). The "Visibility" indicator has been obtained by measuring the number of subnets that generate references to the university web site (source: Ahrefs and Majestic). The "Transparency" or "Openness" indicator was obtained by measuring the number of citations from top authors (source: Google scholar citations). The "Excellence" indicator was obtained by establishing the number of existing papers among the top 10 most cited in 26 disciplines during 2011-2015 (source: Sciomago). Each of these indicators was then weighted according to their importance, according to "webometrics" (5%, 50%, 10% and 35%).

According to "Top universities", universities were ranked according to other important indicators such as: academic reputation, employer reputation, quotes per article, web impact, articles per faculty, H-index citations etc. (www.topuniversities.com).

"USNews" through the MastersPortal set the "Best Global Universities Rankings" composite indicator that also allows a ranking of Romanian universities in the international context and was taken in this study (www.mastersportal.com).

UniRank is another ranking made by 4 international colleges and universities (www.4icu.org) through an international directory and search engine that includes reviews and rankings of over 13,000 recognized universities and colleges. This classification uses two indicators: "Country rank" and "World rank". The university's classification components and algorithm are based on impartial and web-independent metrics extracted from four different web-based sources of information (Moz Domain Authority, Alexa Global Rank, Majestic Trust Flow).

To make a comparison between the universities studied, the criteria mentioned in Table 1 were used, and for ease of comparison, indices of importance were assigned on a scale of 1 to 6 for each indicator taken in the study. Thus the number "1" was assigned for the best result and the number "6" for the worst result. This was done to see if there were any differences between the existing and studied rankings because each specialized institution used different indicators and so the comparison in that state was not possible.

Results and discussions

By centralizing the existing data on the CNFIS site related to the number of students according to the level of studies (license, master and doctorate), the situation presented in Figures 1-3 was obtained.

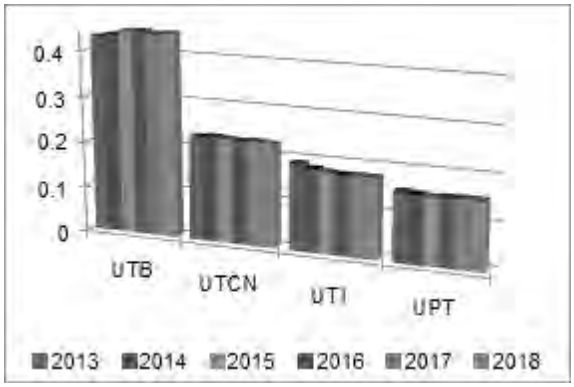

Figure 1. The number of students on the budget places

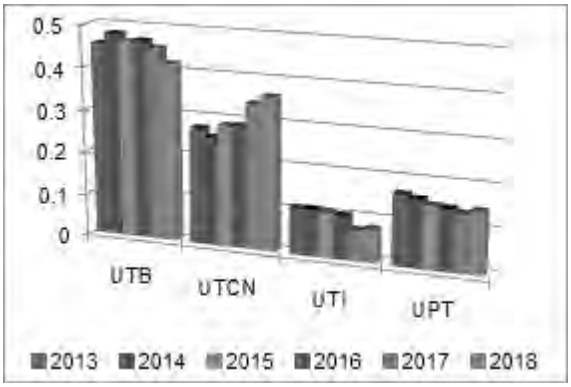

Figure 2. The number of students in the places from the tax

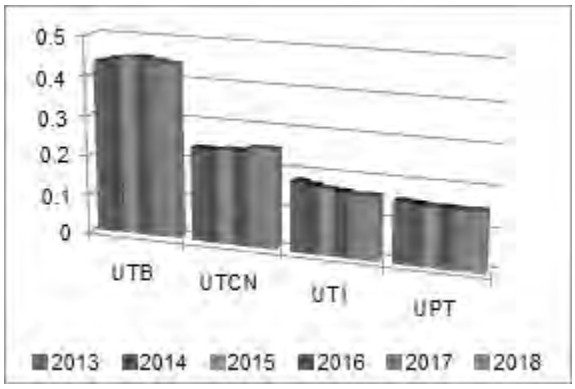

Figure 3. State of the total number of students

From the analysis of Figure 1 it can be seen that in Romania the highest number of students in the technical profile, in the budget, is recorded in Bucharest this one reaching the maximum in 2016, and afterwards there was a slight decrease. After the city of Bucharest (44.56%) the highest number of students is in Cluj-Napoca, here there are small variations of growth and decrease from year to year (in 2018 being 22.68%), then Iasi, registering a slight year-on-year decline (in 2018 being 17.62%) and Timisoara (registering in 2018 a share of 15.14%).

From the Figure 2 it can be noticed that the students' tax situation is slightly different at each university. Although the city of Bucharest (41.71%) with the highest number of students is still the first place, it is noticed that the trend of evolution is decreasing, compared to the trend of the next university of Cluj-Napoca (35.95%), in Iasi there is a decrease (7.8%) and in Timisoara a decrease followed by a slight increase in 2018 (14.55%).

From the analysis of Figure 3 it can be seen that the total number of students (budget and tax) is more balanced, the highest number of students is in Bucharest (44.07%), Cluj-Napoca (24.96%), Iasi (15.93%) and Timisoara (15.04%).

Figures 4-5 show the evolution of the number of students in the license cycle whose studies are financed from the budget, respectively from the fee. In Figures 6-7 there are presented the situation of the number of students from the master cycle of the two types of students and in Figures 8-9 the situation of the students from the doctoral cycle is presented.

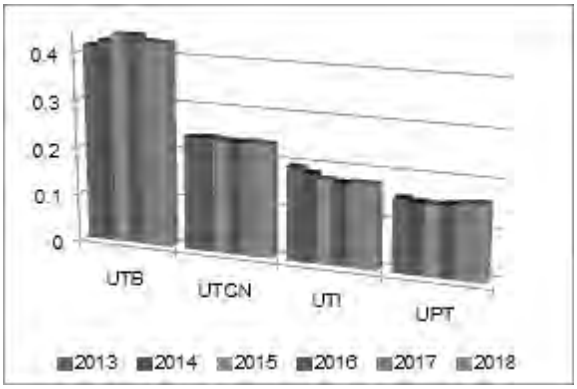

Figure 4. Evolution of the number of license students (budget)

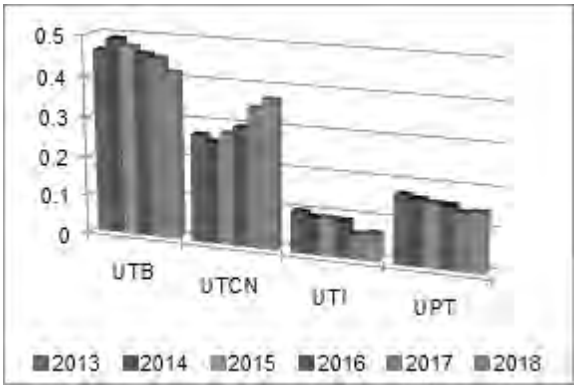

Figure 5. Evolution of the number of license students (with a fee)

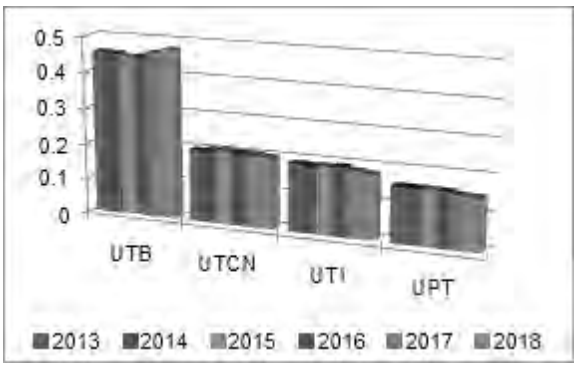

Figure 6. Evolution of the number of master students (budget)

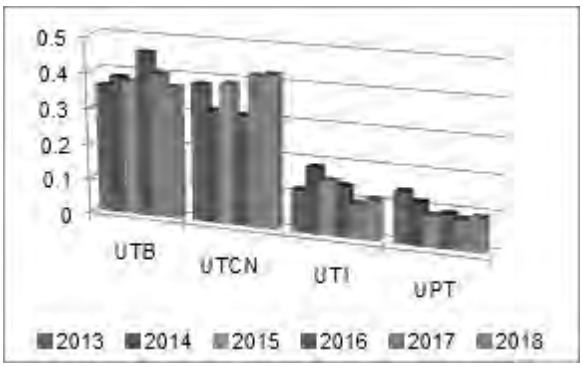

Figure 7. Evolution of the number of master students (with a fee)

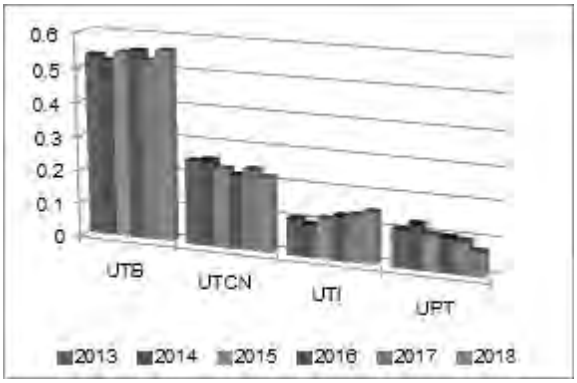

Figure 8. Evolution of the number of doctoral students (budget)

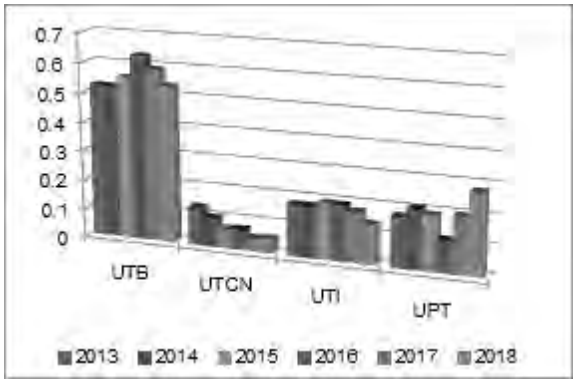

Figure 9. Evolution of the number of PhD students (fee)

From Figure 4 it can be noticed that the highest number of students is in Bucharest (42.7%), followed by a difference of 19% from Cluj-Napoca (23.74%) to about 6 % of Iasi (17.65%) and almost 2% of Timisoara (15.92%).

From the analysis of Fig. 5 it can be said that in the tax license studies, the difference registered in 2018 between Bucharest and Cluj-Napoca is only 5%, between Cluj-Napoca and Iasi about 30% less and between Iasi and Timisoara contrary to expectations an increase of about 8%.

From Figure 6 it can be noticed that the difference between Cluj-Napoca and Iasi is insignificant (2%) as for the difference between Iasi and Timisoara (3%).

From the analysis of Figure 7 it can be said that in the master studies with tax the situation recorded fluctuations in all these years, so in 2018 in Cluj-Napoca there are 5.5% more university students from Bucharest, 31% from Iasi and with 33% against Timisoara.

Figure 8 shows that in the PhD studies in the technical profile in 2018 Bucharest occupied the first place (56.04%), Cluj-Napoca (21.88%), Iasi (15.06%) and Timisoara (7.02%).

Figure 9 shows that in 2018 there are fewer PhD students in PhD studies at the tax-paying places in Cluj-Napoca, followed by Iasi, Timisoara and Bucharest.

As "institutional financing" at the Romanian universities represents the main source of financing of the universities, an analysis of the types of sources of financing from the state budget was made according to the universities studied (Table 2).

Table 2. Situation of financing by types of financing sources

Type of financing	Year	UTB	UTCN	UTI	UPT
Institutional financing	2013	46.13%	20.57%	18.24%	15.07%
	2014	45.68%	21.77%	17.76%	14.79%
	2015	46.61%	21.83%	17.26%	14.30%
	2016	46.77%	21.85%	17.18%	14.21%
	2017	46.70%	21.85%	17.28%	14.17%
	2018	46.54%	21.86%	17.00%	14.60%
Basic Funding (72.5%)	2013	44.51%	21.67%	18.68%	15.14%
	2014	43.75%	22.35%	18.57%	15.33%
	2015	44.34%	22.45%	18.04%	15.16%
	2016	44.46%	22.41%	17.87%	15.27%
	2017	44.65%	22.39%	17.85%	15.11%
	2018	44.89%	22.13%	17.65%	15.34%
Additional funding (26.5%)	2013	49.19%	18.58%	18.93%	13.30%
	2014	47.93%	19.48%	19.06%	13.53%
	2015	48.39%	19.44%	18.72%	13.45%
	2016	47.76%	19.72%	18.47%	14.05%
	2017	47.76%	20.36%	17.70%	14.18%
	2018	47.79%	20.96%	16.62%	14.62%
PhD Grants	2013	47.67%	29.89%	11.59%	10.84%
	2014	49.15%	28.71%	11.52%	10.63%
	2015	52.94%	26.15%	11.35%	9.56%
	2016	53.74%	24.70%	11.86%	9.71%
	2017	53.84%	23.97%	12.82%	9.37%
	2018	53.97%	22.68%	13.74%	9.60%

From the analysis of Table 2 we can say that due to the principle " resources follow student" and the quality indicators obtained, the largest budget funding is registered at UTB, followed by UTC-N, UTI and UPT. Institutional funding is constant at TBU, increased by 1.29% in 2018 compared to 2013 at UTC-N, UTI fell by 1.24% and UPT by 0.47%. If in the case of basic funding the change registered at all universities is up to 0.5% on additional financing, this is most significant, this being the highest decrease to UTI (2.31%) and the lowest decrease to UPB (1.4%) and the lowest high growth at UTC-N (2.38%) and lowest at UPT (1.32%). In the PhD grant grant, if we compare the year 2018 to 2013, the highest increase was registered by UTB (6.3%) and the lowest UTC-N (7.21%) decrease.

As a result of the analysis of the university performance as it is perceived internationally, another classification has been obtained which is presented in Table 3.

Table 3. Ranking of technical universities in Romania according to the global index

Crt. no.	Site Name	UPB	UTCN	UTI	UPT	UTCB	UAUIMB
1	www.webometrics.info	1	2	3	4	5	6
2	www.topuniversities.com	2	4	1	3	-	-
3	www.mastersportal.com	1	2	3	-	-	-
4	www.4icu.org	1	2	3	4	5	6
5	Final Score	1.25	2.5	2.5	3.67	5	6
6	Occupied place	I	II	II	III	IV	V

According to the results presented in Table 3 it can be seen that in the situation where we choose to place a technical university in Romania using the global index, we get UPB (Politehnica University of Bucharest) first, followed by UTCN and UTI, and then by UPT, UTCB and UAUIMB.

In Table 4 a placement of universities has been achieved by adding together several individual criteria by adding an index of importance depending on their score.

Table 4. The ranking of technical universities in Romania according to individual indices

Crt. no.	Name of indicators	UPB	UTCN	UTI	UPT	UTCB	UAUIMB
1	Presence Rank	4	1	2	3	5	6
2	Impact Rank	3	1	2	4	6	5
3	Openness Rank	4	2	1	3	5	6
4	Excellence Rank	1	2	3	4	5	6
5	Academic Reputation	1	3	2	4	-	-
6	Employer Reputation	1	4	2	3	-	-
7	Web Impact	1	2	3	4	-	-
8	Best Global Universities Rankings	1	2	3	0	-	-
9	World rank	1	2	3	4	5	6
10	Final Score	1.89	2.11	2.33	3.63	5.2	5.8
11	Occupied place	I	II	III	IV	V	VI

From the analysis of Table 4 it can be seen that although UPB occupies the best position (first place in placement), it has as strengths the results obtained at indicators 4-9 and as weak points indicators 1, 3 and 4. The second place is UTC-N which has the best results for the 1-2 indicators and the weakest results for indicators 6 and 5. The 3rd place is located UTI which is at a relatively small distance from UTC-N, and fourth is located UPT.

Discussion and conclusions

From the analysis carried out at national level it can be seen that the performance of the university was measured by the evolution of the number of students and the financing obtained by each technical university. Thus, at the level of the technical profile, UTB is the largest university in terms of size and financing and records the best performance, followed by UTCN, UTI and UTP, this classification being somewhat obvious and due to the size of the city where the university is located. Another important criterion, but sometimes difficult to measure by students or parents, is the prospect of economic, cultural and social development of the city. Although the ranking of universities at the national level is made by CNFIS, which establishes the level of financing (taking into account the combined effect of the number of students and predetermined quality indicators) at national level, this hierarchy is not much publicized or known. Comparing this national hierarchy with the international one it can be observed that there are small differences according to the total criteria.

From the international analysis level according to the data studied, it can be noticed that the performance of the technical universities in Romania is measured in terms of the results obtained from various indicators taken into study such as: presence, impact, openness which has not presented in the national evaluations. Thus, if we measure the university performance according to the indicators mentioned in Table 1, the first place is UPB followed by UTCN and UTI, and then by UPT. Thus, UTCN and UTI are in equal positions if we take into account the global index (rows: 5), or in the immediate vicinity if we take into account the individual indices's (rows: 12, 13 and 15). However, if we analyze the position of the technical universities in Romania compared to other universities in Europe and the world, according to gross data, then we can see that in the first 1500s there is only UPB (1251/109/730/1212), indifferent the value of the global indicator being analyzed or the data source to which we refer. The other technical universities can be found in the 1500-2000 range after some classifications or 2000-3000 after other classifications (UTCN: 1565/128/1111/2094; UTI: 1614/88/1140/2367; UPT: 1838 / 121 / - / 2919).

References

Acemoglu, D.,
2006
„Distance to frontier, selection, and economic growth", Journal of the European Economic Association, 4 (1): 37–74.
Aghion, P., Dewatripont, M., Hoxby, C., Mas-Colell, A., Sapir, A.,
2010
„The governance and performance of universities: evidence from Europe and the US", Economic Policy, 25 (61): 7–59.

Atkinson, A., Burgess, S., Croxson, B., Gregg, P., Propper, C., Slater, H., Wilson, D.,
2009
„Evaluating the impact of performance-related pay for teachers in England“, Labour Economics, 16 (3): 251–261.
Bogt H.J., Scapens R.W.,
2012
„Performance management in universities: Effects of the transition to more quantitative measurement systems“, European Accounting Review 21 (3): 451–497.
Byron, K., Khazanchi, S.,
2012
„Rewards and creative performance: A meta-analytic test of theoretically derived hypotheses“, Psychological Bulletin, 138: 809–830.
Campbell, D.J., Campbell, K.M., Chia, H.,
1998
„Merit pay, performance appraisal, and individual motivation: An analysis and alternative“, Human Resource Management Journal, 37: 131– 146.
Cave, M., Hanney, S., Kogan, M., Trevett, G.,
1988
The use of performance indicators in higher education: A critical analysis of developing practice, London: Jessica Kingsley.
Chen, H.M., Kuo, T.S.,
2004
„Performance appraisal across organizational lifecycles“, Human Resource Management Journal, 23: 227–233.
Gielen, A.C., Kerkhofs, M.J.M., Ours, J.C.,
2010
„How performance related pay affects productivity and employment“, Journal of Population Economics, 23 (1): 291-301.
Goodall, A.H.,
2006
„Should research universities be led by top researchers, and are they?“, Journal of Documentation, 62 (3): 388–411.
Goodall, A.H.,
2009a
Socrates in the boardroom: Why researchuUniversities should be led by top scholars, Princeton, NJ: Princeton University Press.
Goodall, A.H.
2009b
„Highly cited leaders and the performance of research universities“, Research Policy, 38 (7): 1079–92.
Hirst, G., Knippenberg, D.V., Zhou, J.,
2009
A cross-level perspective on employee creativity: Goal orientation, team learning behavior, and individual creativity. Academy of Management Journal, 52: 280–293.
Jenkins, D.G. Jr., Mitra, A., Gupta, N., Shaw, J.D.,
1998
„Are financial incentives related to performance? A meta-analytic review of empirical research“, Journal of Applied Psychology, 83: 777–787.
McCormack, J., Propper C., Smith, **S.,**
2013
Herding cars? Management and university performance, The Economic Journal, 124: 534–564.
Kagioglou, M., Cooper, R., Aouad, G.,
2001
„Performance management in construction: a conceptual framework“, Construction Management and Economics, 19 (1): 85-95.
Melo, A.I., Sarrico, C.S., Radnor, Z.
2010
„The Influence of performance management systems on key actors in universities“, Public Management Review, 12 (2): 233-254.

Malik M.A.R., Butt A.N, Choi, J.N.,
2015
„Rewards and employee creative performance: Moderating effects of creative self-efficacy, reward importance, and locus of control“, Journal of Organizational Behavior, J. Organiz. Behav., 36, 59–74.
Melo Al., Sarrico C.S., Radnor Z.,
2012
„The influence of performance management systems on key actors in universities“, Public Management Review, 12(2): 233–254.
Prendergast, C.,
1999
„The provision of incentives in firms“, Journal of Economic Literature, 37, (1): 7-63.
Scott, S.G., Bruce, R. A.,
1994
„Determinants of innovative behavior: A path model of individual innovation in the workplace“, Academy of Management Journal, 37: 580–607.
Official Journal of the European Union,
2011
Council Resolution on a renewed European agenda for adult learning, 2011/C 372/01 (http://eur-lex.europa.eu/legal-content/RO/TXT/PDF/?uri=CELEX:32011G1220(01)&from=RO)
2012
Council conclusions of 26 November 2012 on Vocational Education and Training in Europe 2020 - The contribution of VET to recovery, growth and job creation, 2012/C 393/02 (http://eur-lex.europa.eu/legalcontent/RO/TXT/HTML/?uri=CELEX:52012XG1219(02)&from=EN)
2017
Council recomandation of 11 July 2017 on the National Reform Program of Romania for 2017 and which includes a Council opinion on the Convergence Program of Romania for 2017 (2017 / C 261/22)(https://eur-lex.europa.eu/legal-content/RO/TXT/PDF/?uri=OJ:C:2017:261:FULL&from=EN)
Zhang, X., Bartol, K. M.,
2010
„Linking empowering leadership and employee creativity: The influence of psychological empowerment, intrinsic motivation, and creative process engagement“, Academy of Management Journal, 53 (1): 107–128.

RESEARCH ON CHANGES RELATED TO THE IMPLEMENTATION OF NEW PRODUCTS

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Abstract

Purpose *– This research aims at identifying the main changes resulting from the implementation of new products (INP) and researching how the implementation of new products can influence the micro-system of the workplace through the human resource (workgroup cohesion, attitude towards work, engagement, communication), by means of production (working tools, working procedures, production lines), leading to influences on the performance of the organization (the quality of processes, process evolution, etc.).*

Methodology/approach *- The research methodology was based on the development, application and interpretation of some questionnaires in order to identify the main changes brought about by the implementation of new products in two organizations in Bacau.*

Findings *– The results of the research have led to the highlighting of changes in the human resources (professional relations, communication relations, involvement in work), working procedures, influencing in the end the performance of the organization (product quality, process evolution, etc.). All these changes resulting from the implementation of new products influence the entire micro-system of the workplace and, implicitly, the performance of the organization.*

Practical implications *– The personal implications of this research refer to: research into the changes brought by the implementation of new products within the two organizations, interdependence analysis of "implementation of new products-change-intra-organizational conflict", elaboration of a model for the implementation of new products.*

Key words: *change, new products, implementation, performance, human resource.*

Introduction

This research aims at identifying the changes resulting from the implementation of new products (INP) and the influence on the micro-system of the workplace by formulating and fulfilling a set of objectives: evaluation of some target organizations and subjecting their staff to a questionnaire; identify and use a set of specific analysis tools; observing common traits as a result of these analyzes, in order to ensure a thorough knowledge of the dynamics of "new product implementation - change - intra-organizational conflict" and the development of a set of general rules or procedures that could be applied within a well-defined framework designed to counter the negative effects of the organization following the implementation of new products.

In studying change, its proper definition is probably the most difficult conceptual issue.

The problem of definition becomes essential when we try to distinguish between change and non-change. Many things, probably all things, are always in a form of movement, therefore, in an absolute sense, "things change forever".

The central issue of today's society is change management. In all areas of social, political, economic and cultural life, we face change.

This holds true in particular for organizational life, both in the public and private sectors. We are born in organizations, educate ourselves in organizations, spend a great deal of our lives working on them. (Jackson 1994)

The universe of organizations suffers today a radical process of transformation.

On the one hand, the successful initiation of change and its management can have significant benefits from the perspective of organizational survival, economic viability and human satisfaction.

On the other hand, the inability to anticipate change, the refusal to recognize the need for change or the delayed reaction to it can lead to organizational conflicts through loss of control. (Jackson 1994)

The research issue is timely and current in the transition and the free economy and during times of crisis. Under these circumstances, organizations are required to preserve their existential potential through changes and adaptations to the internal / external tensions of the competitive environment.

Employees, whether they are engineers, economists, human resources specialists, doctors, are people who in turn have to adapt to a changing economy and society, therefore the importance of the study results from the need of people and organizations to adapt to the process of change and its influence.

Implementing new products

The development of new products represents, in the field of marketing, management and engineering, a term used to describe the design, construction and marketing of a product that possesses innovation and keeps pace with the originality and novelty.

Major changes have taken place in the operating environment of the organization in recent years.

These include growing competition (international), faster rate of technological wear, higher costs in developing new products, and rapidly changing consumer demands.

As a result of these developments, an increasing emphasis has been placed on the rapid development of new products and services, but also on market-based innovations. (Karagozoglu 1993)

By new product, we understand: a previously manufactured product that has undergone a change, a product not previously manufactured by the company but already on the market existing a similar one, an existing product on a new market or a completely new product on a new market. (Gupta 1990)

Implementing new products (INP), action closely related to technical innovation activity (new procedures, new technology lines, new work tools) require organizational changes that sometimes impact on performance (Harold L. 2005).

Enterprise performance is what helps to improve cost-effectiveness, not just what contributes to lowering costs or increasing value. (M.Niculescu.1997)

Under the conditions of strong market growth, limited product life cycle and high price erosion, introducing a new product with six months delay will have a negative effect on cumulative profit from 17% to 35% over a five- years. (Karagozoglu 1993)

In the economic literature of our country, the performance of the enterprise is defined as: "an enterprise is performing if it is both productive and effective", the productivity being the ratio between the results obtained and the means employed for obtaining the results, and the effectiveness representing the ratio between the obtained results and the expected results. (M.Niculescu.1997)

The influence of INP on the workplace micro-system (MSLM)

The purpose of this research is to identify the changes resulting from the implementation of the new products, and to observe their influence in the structure of workplace micro-system (MSLM).

In order to achieve a substantive organization of production, in accordance with the mission and objectives set by managers, it is necessary for an organization to be properly designed and organized, both in terms of existing relationships and hierarchies, resource allocation, working methods and their

integration into the process, as well as from the point of view of the necessary technical endowment. (Avasilcăi S 2004.)

At the bottom of the design of any business will have to be the "workplace", the role of managers being to integrate their large variety into a viable and productive system. (fig.1). (Rusu 1980)

There is a great complexity of horizontal (LIO) and vertical (LIV) links between MSLM and the organizational environment, which should provide the framework for the transformation of work objects without disturbing links with upstream and downstream jobs. (Rusu 1980)

The central element of this micro system is the "performer," whose activity will be influenced by all inputs, and in turn will influence other vertical or horizontal elements. (Rusu 1980)

These assumptions lead to the conclusion that an inappropriately managed change that will affect the "performer" leads to damage the entire MSLM. (Rusu 1980)

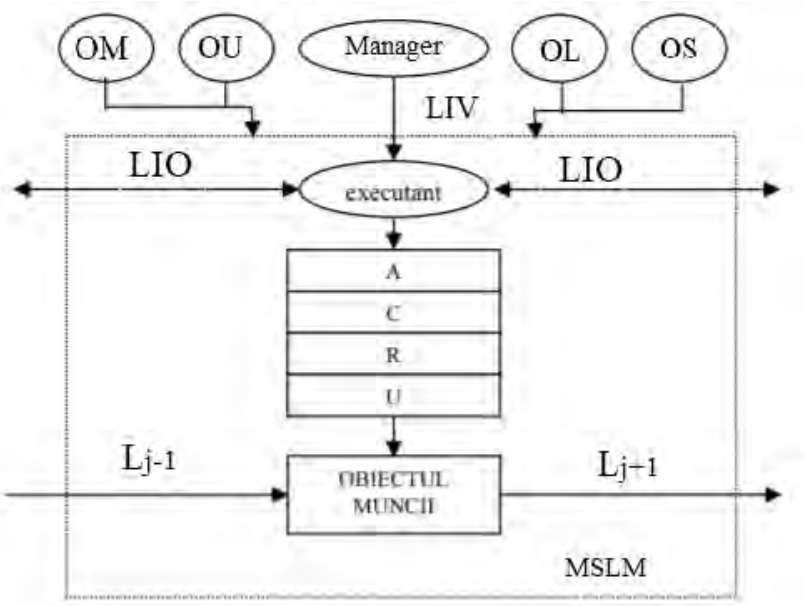

Fig. 1. Workplace micro-system (MSML)
A – display, C – command, R – setting, U – tool, LIO – horizontal information links, LIV – vertical information links, Lj – workplace j, OM – maintenance operator, OS – software operator, OL – logistic operator, OU – operator of utilities

Research methodology

The research was carried out by applying a questionnaire distributed to 50 employees from two companies in Bacau: SC.Aerostar SA (aeronautical profile) and Dan International (textile profile). Following the questionnaire, 50 employees answered.

The distribution was done as follows: 30 questionnaires for SC Aerostar SA Bacau and 20 questionnaires by Dan Dan International.

The questionnaire is structured in two parts: the first part asked for information on the age and seniority of the respondents; in the second part, the impact of the changes brought about by the implementation of the new products on MSLM was studied: the human resource (communication relations, physical and intellectual involvement), means of production (working tools, working procedures), performance of the organization (product quality, process evolution).

In the present research, the evolution of processes refers to the phenomenon of passage through a series of transformations, successive phases to a superior stage of all the processes used for the transformation of raw materials and semi-finished products into finished products. (Bărbulescu C 1997)

The questionnaire looked at the human resource perception of the main changes brought about by the implementation of new products, the level at which they take place in MSLM and the impact on the performance of the organization.

Results and discussions

The results of the questionnaire showed that the changes resulting from the implementation of the new products resulting from the MSLM analysis have several directions, namely: changes in working procedures, changes in professional relations, changes in product quality, changes in process evolution and changes in communication relations, with more obvious changes in product quality and process evolution. (fig. 2).

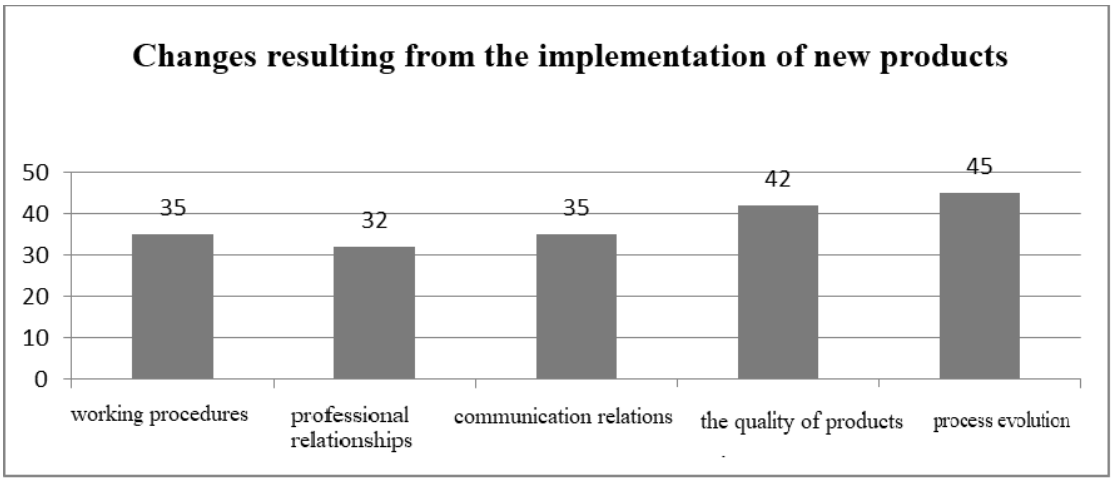

Figure 2. Changes resulting from the implementation of new products

The results were interpreted by creating a database in Excel and using the PivotTable option.

Following the application of the questionnaire, the following information was provided in a synthetic form.

The respondents' age is between 18 and 65, with a majority share of 46-65 years for Aerostar and 31-45 years for Dan International. (fig.3).

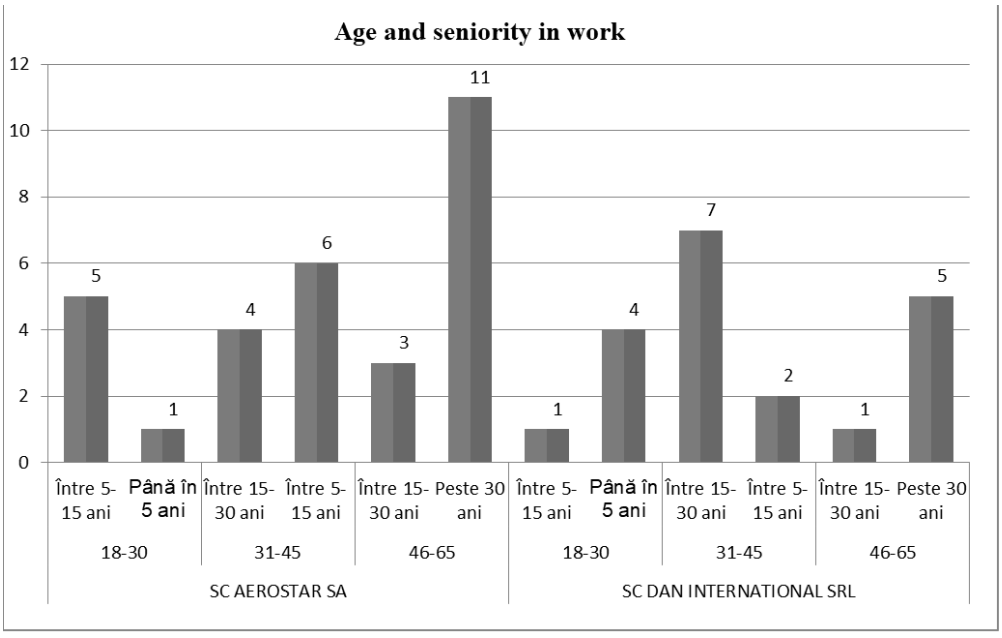

Figure 3. Age and seniority of respondents

Of the 50 respondents in the two organizations, very close percentages asserted that INP frequently increases the performance of the organization, the results obtained specifically on the organization being shown in Figure 4

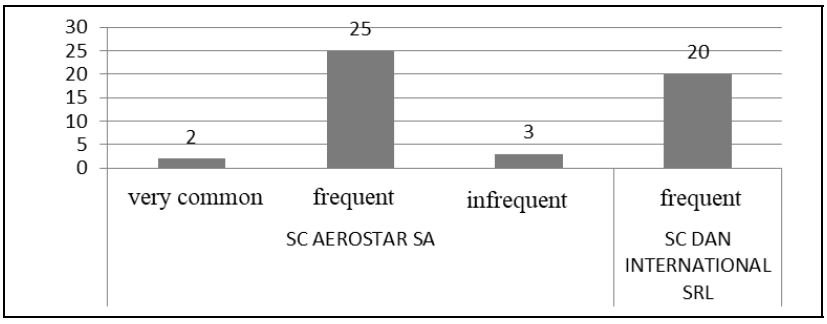

Figure 4. Impact of INP on performance

Respondents believe that the implementation of new products determines changes in horizontal communication relationships with both employees (Fig. 5a) and chiefs (Fig.5b).

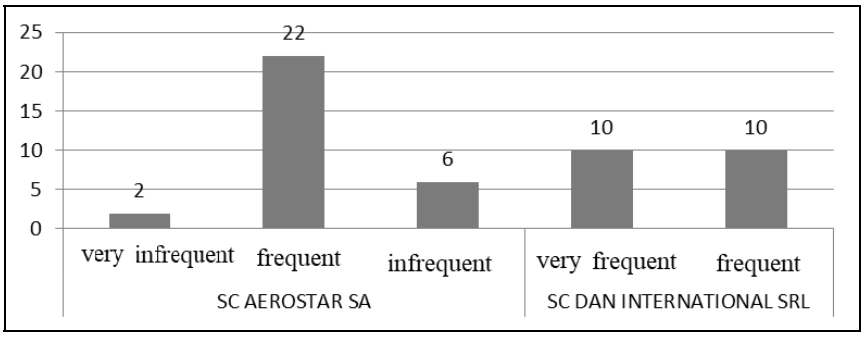

Figure 5a. The Impact of INP on employee relationships

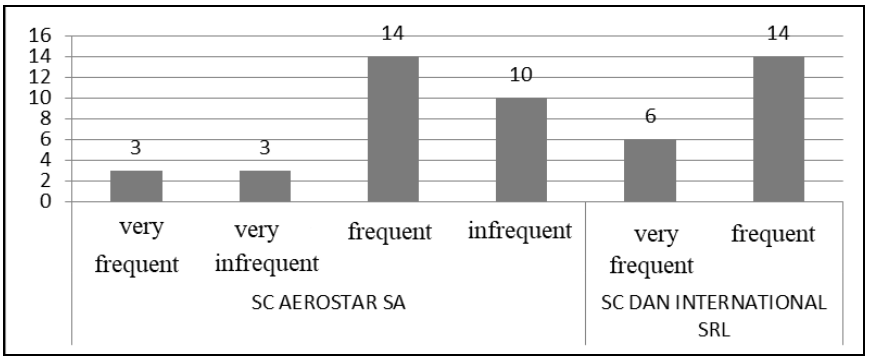

Fig.5b. Impact of INP on chief relationship communications

As a result of the generated changes, the respondents say that, as a result of INP, the intellectual effort increases relative to the physical one, the results obtained specifically on the organization being presented in figures 6a and 6b.

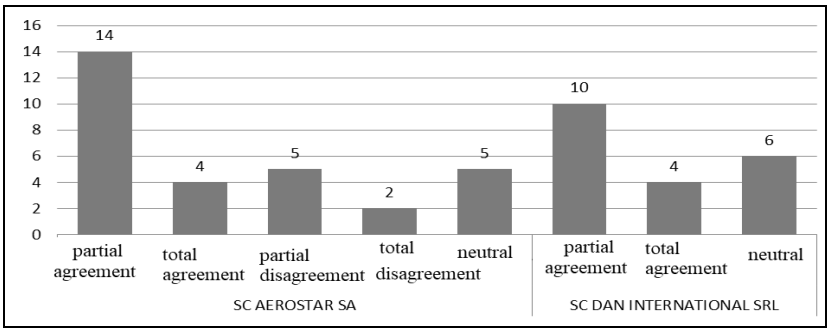

Fig.6a. The impact of INP on physical effort

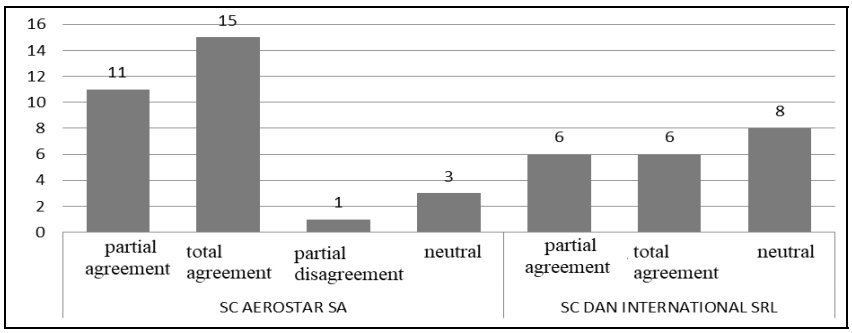

Fig.6b. The impact of INP on intellectual effort

Of the 50 respondents, 35 claim that the INP process often requires changing/modifying the working procedures (figure 7).

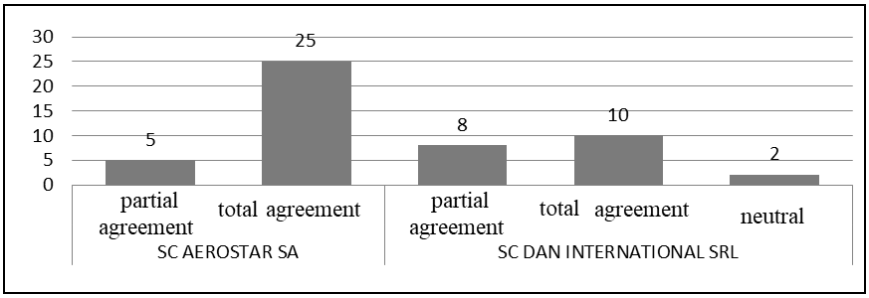

Fig.7. Impact of INP on working procedures

From the questioning of the 50 respondents, there is mutual influence between the implementation of the new products and the working environment (Figures 8a and 8b).

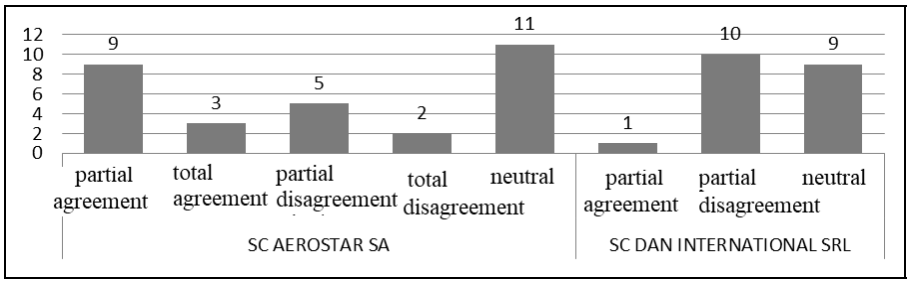

Fig.8a. The impact of INP on the working environment

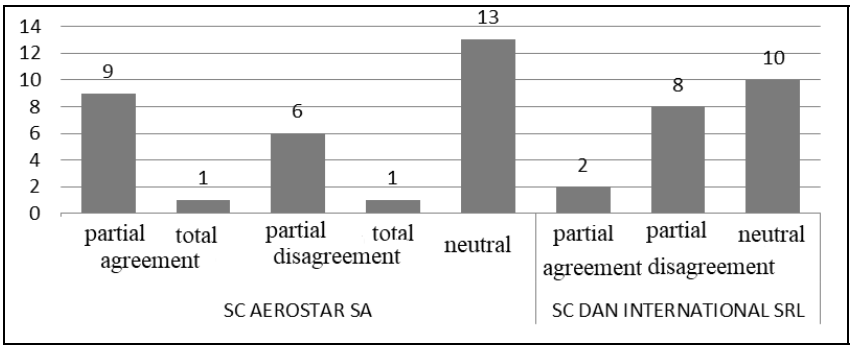

Fig.8b. Impact of working environment on INP

Of the 50 employees, 36 say that the implementation of the new products leads to a significant improvement of the quality of the products (figure 9a), and 38 claim that there is also an improvement of the evolution of the processes (figure 9b).

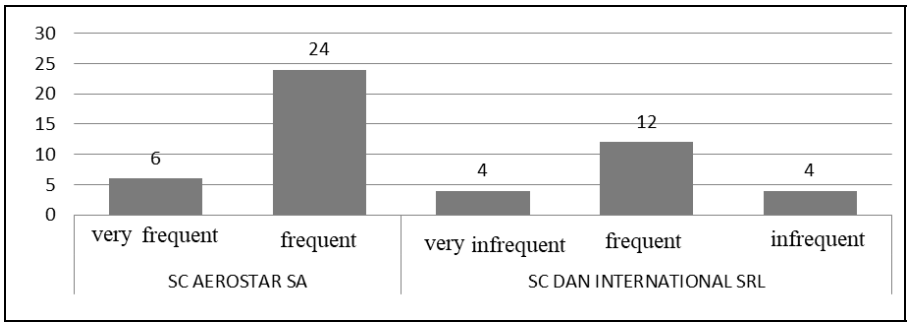

Fig.9a. Impact of INP on product quality

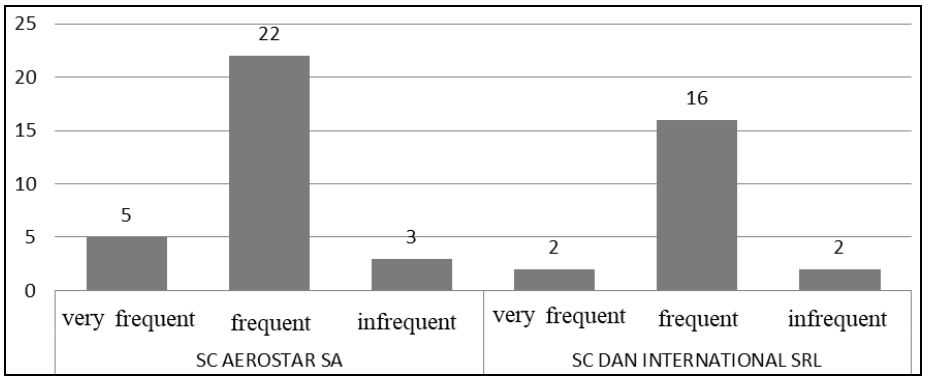

Fig.9b. Impact of INP on Process Evolution

Respondents of the two societies maintain in their majority that the implementation of new products now entails changes in the means of production (figure10).

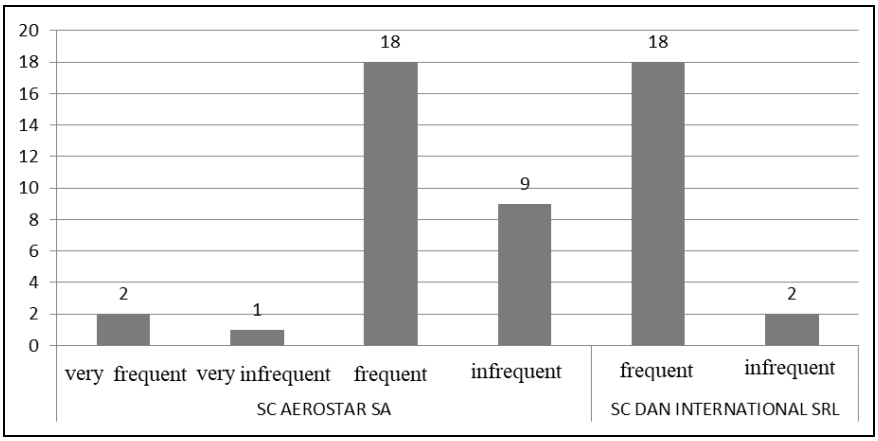

Fig.10. Impact of INP on existing means of production

Out of the 50 respondents, 33 argue that the process of implementing new products often requires new work tools needed for work tasks (figure 11).

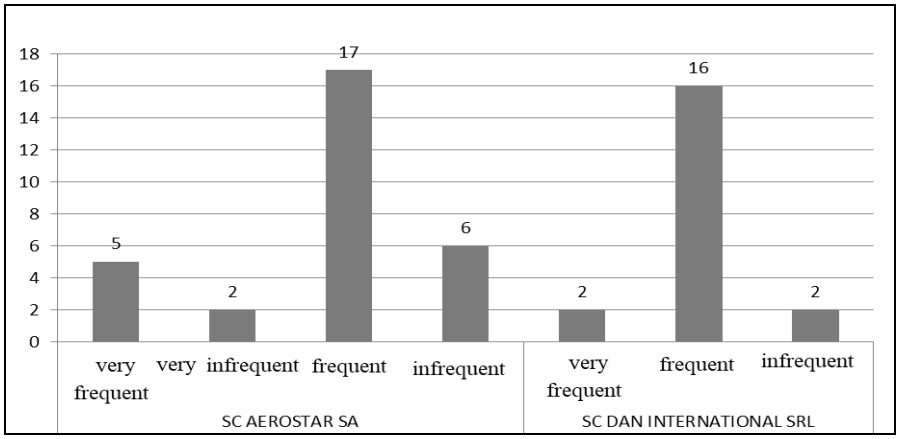

Fig.11. Impact of INP on existing work tools

Conclusions

The aim of this research was to identify changes resulting from the implementation of new products and to assess their impact on human resources and performance.

The results showed in both cases that the workplace microsystem (MSLM) is influenced by changes in: communication relations, working environment, working tools, means of production, working procedures, quality and evolution of processes, organization performance.

This research provides managers with important information support to prevent potential negative changes, contributing to the continuity and even evolution of a company.

Although the activity profile of the two companies to which the questionnaires were applied is different, the results are similar, with the employees' ideas and opinions heading in the same direction.

The differences between the two organizations resulting from the different percentages obtained in the interpretation of the questionnaire can be attributed to the fact that Dan International as compared to Aerostar SA consists of 7 technological lines, each working different products, having different heads and taking into account the fact that monthly a specific target must be exceeded, possibly in the month when the questionnaires were completed, each technological line had different results.

Another difference between the two organizations that can lead to differences is how work is organized, operations synchronized and deploy them on a single tact.

In industrial processes with continuous processes (SC AEROSTAR SA), automated technological lines are created for the whole production process of a product or semi-finished product, the technological process being driven by a panel, a station or a control room.

In the textile industry (SC DAN INTERNAŢIONAL), the organization of the flow production is based on the creation of the apparatus systems, which are constituted by the grouping of the different machinery and equipments necessary for carrying out the basic and related operations, conditioned by the continuity assurance. The textile industry is specific to organizing batch production. In the case of production of a product or a small number of products in large series of production, continuous production and regulated rhythm are used to organize the production.

The disadvantage of using the conveyor belt is that workers with a higher skill and experience can not work with a productivity that is appropriate to their level of ability because of the established pace that takes average productivity into account.

Whether we are talking about changes in working procedures, working environment, working relationships, product quality or process evolution, the implementation of new products produces changes in MSLM both vertically and horizontally.

References

Avasilcăi, S.
2004
Managementul Performanței în Manualul Inginerului Textilist. Tratat de Inginerie Textilă, vol.3, Editura Agir, București.

Bărbulescu, C.
1997
Managementul producției, vol.I și II, Editura Sylvi, București.

Tripon, C., Dodu, M., Raboca, H.
2013
Dezvoltare Organizațională și Măsurarea Performanțelor, Copyright.

Gupta, A.K. and, Wilemin, D.L.
1990
"Accelerating the development of technology- based new products." California Management Review: 32:24-45.

Harold, L., Perry Keenan and Alan Jackson
2005
"The hard side of chance management." Harvard Business review (octomber 2005).

Karagozoglu, N. and Brown, W.B.
1993
"Time base management of the new product development process." journal of product innovation management.

Niculescu, M.
1997
Diagnostic global strategic. Ed. Economică.

Rusu, C., Cojocaru, G., Chinciu, D., Pîcă, A.
1980
Organizarea şi conducerea întreprinderilor din industria uşoară. București, Editura Didactică şi Pedagocică.

Tănase, I.A.
2015
"Change within Organizational Culture." Junior Scientific Researcher 1.1: 27-32.

COMMUNICATION WITHIN MANAGERIAL CULTURE

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Abstract

Purpose *– The paper considers the importance of communication in the management process, both at the management and execution level. The requirement to improve communications strategies and techniques in order to achieve the goals of the organization is the main base issue of the paper.*

Methodology/approach *- The study aims to explore, by making semi-structured interviews with graduate students from Engineering and management specialization, the importance of communication foundations in increasing the managers/employees expertise.*

Findings *– The results of the study show that there are some characteristics and features to be considered when analyzing the organizational behavior from the identity of the managerial culture to the application of an effective communication strategy.*

Research limitations/implications *– While the study has highlighted that there is a real need to increase managers' communication skills and abilities, the results indicate that there is a need to improve communication background in order to adapt it to the technical profile.*

Practical implications *– This will contribute to a better internal/external communication and also will raise the managers' interest in the complementary training.*

Originality/value *– The main contribution of the study is highlighting the specific elements regarding the communication needs of the technical graduates' managers.*

Key words: *Skills and strategies in management, managers vs. employees, organizational communication*

Introduction

Since the last decade of the last century, Les Giblin (2000) underlined in his book "The Art of Dealing with People" the fact that 15% of personal success is due to technical training and talent in practicing the profession and 85% is based on the personality and the interaction with successful managers. If we refer to that last category both characteristics have developed under the influence of culture gained through various channels, but especially based upon organizational culture (Abrudan, 2012). Starting from the idea that culture was assimilated with a knowledge bag stored in memory, according to recent studies, it can be identified a manager culture, and also, a culture of the employee. Both are very important because they contribute to the identity of the organization, creates the values and the managerial philosophy, but especially to establish the way the manager should cooperate with intern and extern public in current activities and crisis situations. Due to the enlargement of the EU and the consequent increase in complexity of all challenges, but also for the exponentially growing mass information of science (Zichil and Abrudan, 2005), improving the communication background in order to adapt it to the technical profile is a target that shouldn't be missed. The communication strategies are connected with the specialized knowledge applied both in top management and employees' activities. Current literature on the field acknowledges that the role of organizational communication has enriched organizational success.

Organizations, small, large or corporations, with or without their will, are identified through an organizational culture, as people identify themselves through personality. Besides, considering that the management can only be done with people, through people, and they are the depositories of a

specific culture, it would be ideal that "all employees behave as if the enterprise were theirs" (Beatty, 1998). Over time, the specialists defined the organizational culture by highlighting what they believed to be the main feature. “A relatively new term that concerns to entrepreneurs and entrepreneurship is the entrepreneurial culture. Entrepreneurial culture can be considered a subtype of culture oriented towards entrepreneurship. As stated by Wong (2014), entrepreneurial culture can be defined as a set of values, beliefs and attitudes shared within an organization or a society and which characterizes entrepreneurial lifestyle. The attributes and characteristics of the entrepreneurial culture arise from the definition of the entrepreneur and entrepreneurship. Thus, among the characteristics of entrepreneurial culture it can be included: risk encouraging; failure toleration; innovation products promoting; improvement encouragement and continuous change; vision and passion for business etc.” (Drob, 2016).

H. Mintzberg proposes three roles fulfilled by organizational communication: interpersonal roles (leader in relationship to employees), informational roles (spokesperson), and decision roles (the manager who proposes strategies and actions, negotiates and resolves conflicts, allocates the needed resources in order to carry out the activities). Specific culture stored in people's minds is based on experiences, more or less pleasant, all in the past. For this reason, "things that seemed to belong to the past suddenly becomes the future" (Brzezinski, 2000).

Rudi Klauss and Bernard Bass consider that communication has a paramount importance to managers, by connecting it with leadership and influence. In order to become a good leader you must influence the others and apply effective communication. So, in fact, leadership requires effective communication. Internal communication departments along with the funds allocated by organizations in increasing communication skills of the employees highlight the fact that communication has a significant impact on organizational development.

Therefore, “communication is a central phenomenon in organizations and is very important, especially for management. Certainly, as an activity, it occupies a vast majority of manager’s time, and thus any increase in manager’s effectiveness or skills as a communicator should contribute directly or indirectly at organization performance improvement” (Klauss and Bass, 1982).

Moreover, studies show that processes of the organizational communication lead to an increase of organizational performance, efforts being done to identify the most efficient communication skills and strategies in management (Hargie, Dickson and Tourish, 1999). Several aspects were pointed out in the current literature concerning the importance of communication skills and strategies regarding management effectiveness. Interpersonal communication abilities are referred to key tools for successful management and leadership, but also for the professional and personal success (Hargie, 2016). According to Hargie, Dickson and Tourish (1999) there are some aspects that must be taken into consideration when we analyse an organisation: communication is necessary to effective management, communication becomes paramount to business success, communication is the key to good management, communication training is an on-going activity for all members and staff, management supposed to enable others to take responsibilities for criticism and decision-making.

Data analysis

The research aims to a better exploiting of professional knowledge, managerial communication skills and interaction with socio-economic partners. At the same time, the present paper seeks to identify how managers perceive their professional training and the importance of communication in an organization.

This qualitative study was designed to explore the role of communication in managerial culture from the perspective of top management and execution level, subjects who graduated Engineering and management specialization. We conducted 10 semi-structured interviews in Bacau County, Romania (4 women and 6 men) with participants age ranged between 30 and 40 years old which work in public institutions and private companies.

First of all, we asked the subjects if they can indicate some values that are specific to their organization. Most of them refer to organization like a whole unit where there are objectives, rules and norms, results to achieve and an evaluation of their activity. All these elements must take into consideration the legal framework and the field of the organization.

Among the values mentioned by the respondents we can summarize: “unity”, “efficiency”, “persistence”, “responsibility” and “creativity”. In addition, subjects also mentioned that is it important to take into consideration the category of public, especially the costumers’ satisfaction. This objective can be accomplished by implementing the procedures of the organization and rules that must be respected by the employees.

“In my organization the values are focused on raising the awareness of the employees in order to be involved in current activities and to have a clear and honest vision about the reality inside the organization. This makes us understand better the fact that we contribute to the quality of the final product. So, the costumer with his creativity is in the centre of the organization’s development” (Woman, CEO, private company).

During the conducted interviews, some answers revealed the fact that top management combines the efficient communication strategies with the authoritarian managerial style, both at the level of vertical and horizontal relations. The subjects underlined that a managerial culture must be founded on several aspects: “an open and honest communication”, “an efficient communication between the departments of the organization”, “building a successful job team”, “time and efficiency are more important than the hierarchical organization structure”, “nothing is more important than feedback”.

Also, it is essential for the organization to encourage employees to evaluate their activity and to be aware of the way that management values their knowledge and abilities. In this sense, most of the respondents admit that they are asked to make proposals in order to improve the organization’s activity, using questionnaires or discussions with leaders, even if the period of implementation lasts longer. Most of the examples given by the subjects refer to the time efficiency, identifying cheap solutions, but effectives, more training sessions and increasing the organization’s brand image. We were interested to find from the subjects “How important are your proposals in the final decision”? Most of them consider that the proposals are important and taken into consideration, but the final decision is taken by the top management. “The big decision and the responsibility belong to the institution’s leader, that’s why all the proposals must be validated or not, accepted by specialized commission according to the field” (Man, public institution).

The evaluation of the professional activity is improved by knowledge and gained experience and also personal skills which often complete or highlight the technical information. It is important not only to have specialized knowledge or to identify technical solutions, but also to be persuasive and to impress the manager: “Knowledge and gained experience make their mark often, but there are some situations when personal abilities are very important and make a difference. I believe that experience and knowledge acquired can’t be highlight without personal skills, even for a moment. I am appreciated for both, but especially for personal skills” (Female, Client Relation Manager).

The authors were also interested in finding some skills that are relevant to the culture of the organization. The interviews revealed a multitude of aspects regarding motivational skills and logical thought: critical approach, active listening, assertiveness, proactive attitude, creativity, adaptability, responsibility, team ability, analysis and synthesis.

These answers confirm the information given regarding the balance between specified knowledge and personal skills. Beyond gained experience several aspects count such as: positive attitude at work, the willingness to learn, active implication, taking responsibilities and making decisions.

“Mathematical, numerical and physical thinking, proactivity and adaptive capacity, planning and synthesis, easy integration in new working places and responsiveness are essential. All these skills must be tested in different and specific situations when an employee can put them into practice. Once you proved that you are able to apply those skills you can improve your status as a specialist beyond your knowledge. Nowadays, specialized information is no longer main criteria when selecting employees because we all gain experience during the process, by learning and training” (Woman, CEO, private company).

Regarding new employees we investigated the subjects about the main qualities that are important when they make the selection of the candidates. Most of them considered that communication is the first skill that a candidate should demonstrate followed by experience, the ability to work in a team, proactive attitude, respect for the management team of all level. These answers confirm once again the importance of personal skills, especially for new employees which haven’t yet the opportunity to

apply their knowledge. However, due to the information that was revealed during the interviews even for employees with a lot of experience, the communication skills are very important for evaluating professional activity.

Mintzberg, (Mintzberg, 1975) proposed that traditionally organizations (profit making or not for profit) can be divided into five components. Components identified by Mintzberg are useful for understanding the workflow of organizations (Fig. 1).

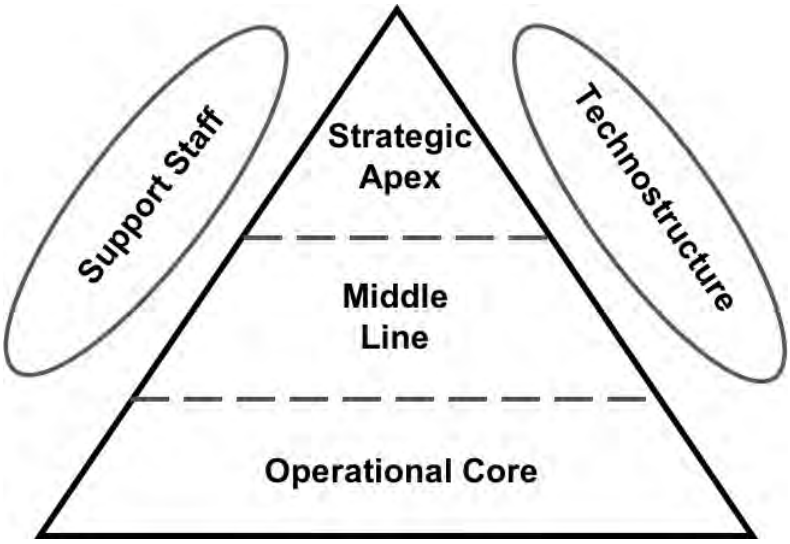

Fig. 1. Components of an organization according to Mintzberg

In order to discover the role of communication within organisation culture we asked the subjects a series of questions to establish the following aspects: how they communicate with internal and external public, who handles that responsibility, if communication strategies were applied in crisis situation, if the organisation encourage personal to participate at workshops and training courses.

An efficient communication engages both employees and top management. Internal communication has become an important aspect because has consequences on public. In the case of internal communication, the dysfunctions can be resolved in the process, while in external communication the negative effects perceived by the customer affects the image of the organisation. Each employee is using all the communication channels, but only managers or a PR specialist assumes the role of spokesperson and transmits the official declarations. “Considering that any communication has an important component of intended influence, we can argue that it is liable if sometimes contain untruths, intending to convince rather than to inform. The fundamental function of public relations is to prove loyalty towards the clients, to serve their objectives through filtering and selecting the truth that will be distributed to larger audiences. The truth in this context is meant not to serve the interest of the public, but rather the purposes of the client” (Cirtita-Buzoianu, 2013).

A particular case is represented by the crisis situations when communication strategies and skills can reduce the negative effects. In terms of communication, it is important not to create new crises inside the crises before we find the best solution to fix the problem in order to gain time and not disappointing the public. “Yes, I have had some problems with materials due to manufacturers and suppliers. I’ve searched the cause, studying new materials, performing different tests and launching some communication sessions with other companies having the same activity profile; communication may give us a solution"(Male, Administrator, private company); "I have been involved in several projects with different full grown landmarks. A plant was blocked while I was someplace else to solve other problems. Responsiveness and decisions taken at the moment helped me to unlock the situation during a few minutes"(Man, CEO, private company).

All the subjects declared that they participated on training courses and recognised the importance in improving their activity. They underlined that by attending those courses they shared different experiences and new situations with their colleagues, developed new collaborations, in order to

remain informed with new law changes. Some employees must attend training courses if they want to advance in a new position inside the organisation.

Finally we were interested to investigate how important is to be a good communicator and not just a specialist in your field. There were some situations when you persuaded your manager with communication strategies instead of technical solutions? In what matter the professional and organisational success relies on an effective communication with management, employees, colleagues and clients? All the answers given by the respondents concluded that the knowledge bag must be duplicated by an efficient communication. In some situations if you are not very communicative is possible that you're gained experience to serve not to resolve a problem or to impress your head.

"When there is no communication, the technical solutions are useless because we faced several situations in which we've lost clients due to the lack of communication even if the technique was perfect executed" (Man, Administrator).

At the same time, the departments of communication and public relations from different organizations can conceive specific training sessions, tailored to the needs of employees and can also make proposals for development strategies, that are submitted to the top management.

Discussion and conclusions

Managerial communication is the core of organizational communication. Only an efficient communication can fulfill management by planning the activities, coordination and supervising, evaluation and self-evaluation, motivating the members to contribute at the development of the organization (Păuş, 2006). Managerial culture has foundations in communication, by appealing to different forms and types of communication applied in the organization.

Increasing interaction based on feedback has encouraged the introduction of new means of communication through which managers at any level can receive a real message from employees and clients, in order to adjust the decisions. Therefore, managerial communication becomes essential for a good development. Communication is a tiebreaker criterion when employees are evaluated or candidates are selected. When organizational crisis appear the best solutions combine knowledge bag with efficient communication strategies.

Moreover, the study has shown that there is a link between communication and vocational training of graduates from technical faculties, in order to gain top management positions. In all training courses made by managers or employees communication has a key role. The main reason of these courses is on one side to prevent or to stop the evolution of the crisis (internal communication) and on the other side to increase listening skills and to provide a positive message to the public (external communication).

References

Abrudan, I.
2012
Managerial culture. Cluj-Napoca: Digital Data Publishing House.
Beatty, J.
1998
The world in the view of Peter Drucker. Bucuresti: Teora Publishing House.
Brzezinski, Z.
2000
The big chess board. American supremacy and its geostrategic imperatives. Bucharest: Encyclopedic Universe Publishing House.
Cirtita-Buzoianu, C.
2013
"Ethical Dilemmas in Practicing Public Relation." The Scientific Journal of Humanistic Studies, 8 (5): 208-2011.

Drob, C.
2016
“Particular aspects regarding entrepreneur and entrepreneurial culture.” Studies and scientific researches, Economics edition, 23: 65-70.
Giblin, L.
2000
The Art of Dealing with People. Bucureşti: Curtea Veche Publishing House.
Hargie, O. DH.
2016
Skilled Interpersonal Communication: Research, Theory and Practice. London: Routledge.
Hargie, O, DH, Dickson, D., Tourish, D.
1999
Communication in management. Gower: Gower Publishing Limited.
Klauss R., Bass, B.
1982
Interpersonal Communication in Organizations. New York: Academic Press.
Mintzberg, H.
1975
“The Manager’s Job: Folklore and Fact.” Harvard Business Review.
http://accalecturenotes.blogspot.com//02/what-is-mintzbergs-organizational.html
Păuş, V.A. 2011
2006
Communication and Human Resource. Iaşi: Polirom Publishing House.
Wong, M. A.
2014
Entrepreneurial culture: Developing a theoretical construct and its measurement, University of Western Ontario - Electronic Thesis and Dissertation Repository, Paper 2138. http://ir.lib.uwo.ca/cgi/viewcontent.cgi?article=3435&context=etd.
Zichil, V, Abrudan, I.
2005
Trends in the Development of Higher Technical Education in Europe. Review of Management and Economic Engineering, vol. 4, No. 1 (13): 15-23.

RADIOGRAPHY OF PENSION SYSTEMS IN CENTRAL AND EASTERN EUROPE

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Abstract

Purpose *– The main purpose of the article is to highlight the main features of the public and private pension systems in Central and Eastern Europe, in the light of the governmental measures envisaged in the coming period.*

Methodology/approach*– Using the comparison method, we investigated data on the value of assets managed under the pension systems (public, private) of the countries under review..*

Findings*– Much of the pension systems in the observed countries show the same pattern in governmental measures implemented to reform and adapt to recent macroeconomic changes.*

Research limitations/implications *– One of the limitations of the research concerns the limited access to statistical information on the volume and performance of the pillar I of the countries concerned, as well as on legislative limitations expected to be implemented in the coming period.*

Practical implications *– The article can be used in knowing how different pension systems work and what government measures could be implemented in this regard.*

Originality/value *– The originality of the article is the choice of pension systems in the same geographic area as Romania, in terms of the social and political structure.*

Key words: pension funds, regional macroeconomic context, investments.

Introduction

The management of private pension funds is one of the most current topic approached in the capital market. Achieving a bigger return than the deposit interest rate by applying complex investment policies by pension fund managers is the main objective in the macroeconomic context. The fundament for the investment decision is based on management elements as well as compliance with some legal rules applicable to pension funds. The objective of the research process was to compare different pension systems from 5 countries and the way the governments manages the assets generated by the contributors. The analysis focused on both a comparison of the private pension system in Romania with those in the Eastern European region (Poland, Hungary, Bulgaria and Croatia) as well as the analysis of the degree of impairment to the local and regional economy. The actuality of the theme is generated by the present situation in Romania regarding the actions of the private pillar II administrators and the uncertainty of the legislative changes with potential for implementation. Another issue that was addressed in the article was the effect of a possible elimination of the Romanian pension pillar II and, implicitly, the degree of damage to the domestic capital market and to the national economy.

Radiography of pension systems in the countries of Central and Eastern Europe

Romania

The entire pension system in Romania is divided into 3 categories depending on the entity that manages it (Ministerul Muncii și Justiției Sociale, 2018). Thus, first pillar - mandatory pillar - is managed by the Romanian State through the Ministry of Labor and is regulated by Law 263/2010. The second pillar pension pillar - is managed by 7 private management companies operating on the basis

of Law 411/2004, the total assets are worth 43.04 billion lei (Anghel & Anghelache, 2018), with an increase of 23.84 percent against the same period last year, according to the Financial Supervisory Authority. The third pension pillar- voluntary pillar - consists of 10 private pension funds that manage total assets (Financial Supervisory Authority, 2018) of 1.83 billion lei, on January 31 2018, up 19.23 percent compared to January 31 2017, according to Financial Supervisory Authority (ASF) data..

Regarding the seven companies that manage funds related to pension pillar II, the following financial data are known:

- Private Administered Pension Fund ARIPI - administered by Generali Private Pension Funds Management Company S.A. As at 31.12.2017, the amount of the pension fund capital was 592.1 million Euros, registering a gross profit of 23.7 million Euros. (Generali Pensii, 2018).
- Private Administered Pension Fund AZT VIITORUL TĂU - administered by Allianz-Ţiriac Private Pensions Management Company of Private Pension Funds S.A. As of 31.12.2017 the value of the pension fund's capital was 1.85 billion Euros, registering a gross profit of 58.4 million Euros (Allianz-Ţiriac Private Pensions, 2018)
- Private Administered Pension Fund BCR - administered by BCR PENSII, SOCIETY OF ADMINISTRATION OF PRIVATE PENSION FUNDS S.A. As of 31.12.2017 the value of the pension fund capital was 558.2 million Euros, registering a gross profit of 28.6 million Euros (BCR Pensions, 2018).
- Private Administered Pension Fund BRD - managed by BRD SOCIETY OF ADMINISTRATION OF PRIVATE PENSION FUNDS S.A. As of 31.12.2017, the pension fund's capital contribution was 295.5 million Euros, registering a gross profit of 0.67 million Euros (BRD Pensions, 2018).
- Private Administered Pension Fund METROPOLITAN LIFE - managed by Metropolitan Life Management Company of a Private Administered Pension Fund S.A. As of 31.12.2017, the amount of the pension fund capital was 1,206.8 million Euros, with a gross profit of 44.4 million Euros (Metropolitan Life, 2018).
- Private Administered Pension Fund NN - administered by NN Pensions Management Company of a Private Administered Pension Fund S.A. As of 31.12.2017 the pension fund's capital was 3,080.8 million Euros, with a gross profit of 105.7 million Euros.
- Private Administered Pension Fund VITAL - administered by AEGON Pensions - Private Pension Funds Management Company S.A. As of 31.12.2017 the value of the pension fund capital was 812.2 million Euros, with a gross profit of 25.8 million Euros (Aegon Pensi, 2018).

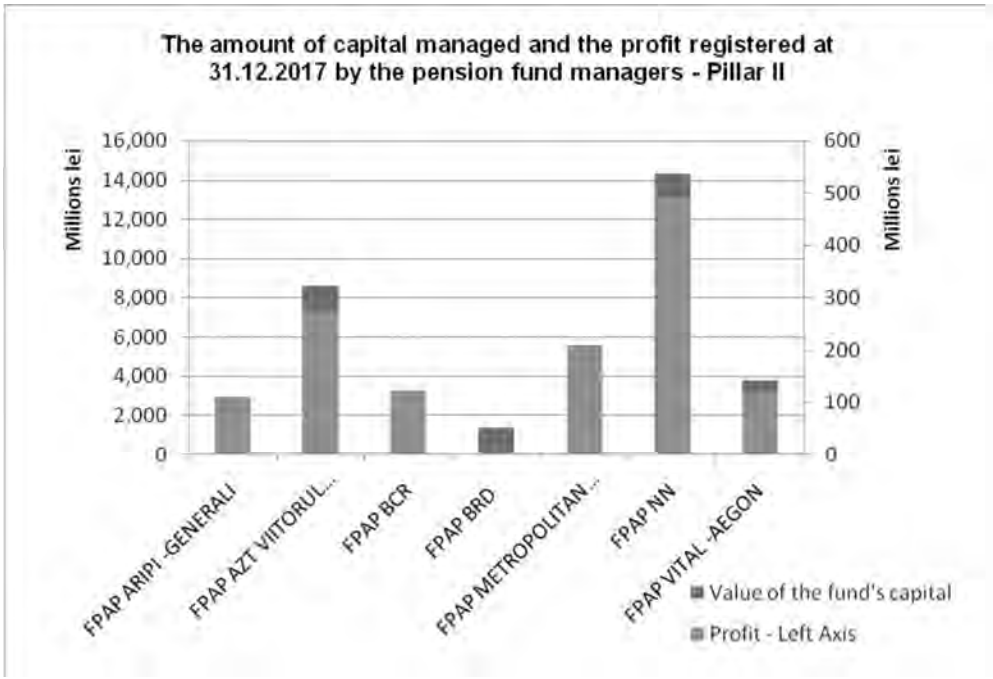

Figure 1. Amount of managed capital and profit registered in 2017 by pension fund managers - Pillar II

Source: Processing by data provided by the 7 pension Fund Managers – Pillar II

The average interest rate on deposits in lei over a period of more than 2 years, in 2017, was 1.4 percent (National Bank of Romania, 2018), whiles the yields from the 7 pensions funds managing contributions in the second pillar for the same period, are presented in Table 1.

Table1. The returns earned in 2017 by the 7 funds managing contributions under the pension pillar II

	Fund Manager	Name of the Pension Fund	Return of December 2017 (%)	Market share of December 2017 (%)	Risk degree assimilated, according to ASF
1	GENERALI SAFPP S.A	Private Pension Fund ARIPI	3.9348	8.56	HIGH
2	ALLIANZ-ŢIRIAC PENSII PRIVATE SAFPP S.A	Private Pension Fund AZT VIITORUL TĂU	3.5005	21.69	MEDIUM
3	BCR PENSII SAFPP S.A.	Private Pension Fund BCR	4.8028	6.54	MEDIUM
4	BRD SAFPP S.A	Private Pension Fund BRD	3.1176	3.46	MEDIUM
5	METROPOLITAN LIFE SAFPP S.A	Private Pension Fund METROPOLITAN LIFE	4.2493	14.14	MEDIUM
6	NN PENSII SAFPP S.A.	Private Pension Fund NN	4.0681	36.10	MEDIUM
7	AEGON PENSII SAFPP S.A	Private Pension Fund VITAL	3.8646	9.51	MEDIUM

Source: (Autoritatea de Supraveghere Financiară, 2018)

Comparing the yields obtained by the pension funds in the last year, with the interest rate offered by the Romanian banking institutions, it can be concluded that, in terms of profitability, it is recommended to invest in fund units that manage the pension pillar II. In the context in which the current legislation limits the investments of investment funds on foreign markets, much of the plus-value obtained is invested in the domestic economy, which is a factor generating economic growth.

Among the most important institutional investors in Romania are pension funds, contributing to GDP growth by reinvesting capital in the national economy. Thus, in the year 2017, at the level of the second pillar of the total investments made by the pension managers, 91 percent were made in Romania and 7 percent in the European Union (Financial Supervisory Authority, Private Pensions in Romania, 2018). The total value of assets managed in 2017 under the second pillar of private pensions was 39.74 billion lei, coming from 7.04 million taxpayers.

Figure 1. Market share of the seven funds managing contributions under the second pillar of pensions in 2017. Source: (Autoritatea de Supraveghere Financiară, Pensiile Private în România, 2018)

Poland

In Poland, starting October 2017, the retirement age is 65 years for men and 60 for women, the level of the pension being established as a ratio between the person's contributions to the lifetime pension fund and the life expectancy at the time of retirement. In Poland, works a pension system based on 3 pillars:

- Pillar I - is a PAYG (pay as you go) system, based on national defined contribution accounts (NDCs), governed by the State Social Insurance Institution (ZUS). It has replaced the former pay-as-you-go system.
- Pillar II - is a mandatory pension scheme managed by open-ended investment funds (OFE). The pillar II contribution is 2.3 percent of the employee's income. In 2011, the Polish government decided to reduce its contribution to Pillar II from 7.3 percent to 2.3 percent, thus questioning the profitability of these funds. The total assets managed under Pillar II at the end of June 2018 amounted to approximately 41.5 billion Euros, 85% of which were securities, according to the Polish Financial Supervisory Authority (2018).
- Pillar III - was introduced as part of the pension reform in 1999, being a pillar that manages voluntary occupational retirement pensions. The Polish government stimulates investments in the third pillar of pensions, providing a 7 percent relief from social security contributions for active members.

Currently, the Polish government is targeting the abolition of the mandatory pension pillar II, which should have been in force since January 1, 2018, postponed for implementation in the second half of the year. Under the new regulations, pension pillar II will be dissolved, 75 percent of assets being transferred to Pillar III of pensions, and the remaining 25 percent to the state-run pillar.

Hungary

The pension system in Hungary is based on the unitary functioning of the state pension pillar. It works on the PAYG principle, the minimum retirement age being 63 years, and by 2022 it will grow to 65 years. In order to qualify for the retirement allowance, the person needs to contribute to the pension system for 20 years.

Contribution to the state pension system is calculated as 33 percent of the income earned in the first 10 years of contributions. Between the 11th and the 25th year, each year adds 2 more percentages a year, and between 1 and 26 years contributions add 1 per cent. Starting January 2018, the minimum monthly pension set by the Hungarian state is 28,500 forints (equivalent to 88 Euros).

Regarding the mandatory pension pillar II, it operated in Hungary until 1 November 2010, following a period of suspension of all contributions to Pillar II. As of 01.01.2012, all contributions to the pension fund were redirected to the public system, with pillar II taxpayers having the option to choose to transfer the funds to the first pillar or to keep them in the pillar II funds.

Croatia

The Croatian pension system is based on 3 pension pillars. In the 1990s, Croatia's pension system underwent reforms similar to those in most of the Central and Eastern European countries. The country has reformed its first pillar and introduced mandatory and optional pillars. In the case of Croatia, these reforms have taken place in the context of more dramatic social and economic changes than in other regions. The unfavorable context was caused, on the one hand, by the transition from communism to capitalism and, on the other, by the war in the former Yugoslavia. Regarding the 3 pension pillars active in Croatia, we identified the following characteristics:

- Pillar I - was reformed in 1999 as a PAYG system, along with the establishment of mandatory pension pillar II. The retirement age for men has increased from 60 to 65 years, while in women it has increased from 55 to 60 years. The contribution rate to the state-run pension pillar I is 20 percent, deducted from employees' salary income.
- Pillar II - started operating in 2002, all persons employed under the age of 40 being obliged to participate. Assets under this pillar are managed by 4 asset management companies, managing 12 investment funds, the value of assets being managed in December 2017 of 12.4 billion Euros (Croatian Financial Services Supervisory Authority, 2018).

- Pillar III - was implemented during the same period as Pillar II, and on 31.12.2017 it consisted of 1.844.272 taxpayers, the value of the assets being managed being about 642.3 million Euros. In the third pillar of voluntary pensions, four voluntary pension fund management companies operate, managing 29 facultative pension funds.

According to the views of the private pension environment in Croatia, it is estimated that the number of taxpayers in Pillar II and III will not change significantly in the next period, except for a possible nationalization of the private pension system.

Bulgaria

The pension system in Bulgaria is structured on 3 main pension pillars. In 2017, the private pensions market in Bulgaria has activated 9 companies that have managed 28 pension funds. The main features of pension pillars in Bulgaria are:

- Pillar I - is managed by the state and targets the mandatory contribution of all contributors (PAYG). The rate of contribution to the first pillar for employees is 8.05 percent, while the employer's contribution amounts to 14.95 percent.
- Pillar II - is structured on 2 types of mandatory pension funds: Universal Pension Funds (UPF) and Professional Pension Funds (PPF). The two types of funds are managed by licensed companies called Pension Insurance Companies (PIC), the difference between the two types of funds being that PPFs are made up of employees operating under special conditions (heavy / dangerous). Each PIC can only manage one PPF and one UPF.
- Pillar III - is based on additional voluntary pension funds (VPF) and occupational pension schemes (VPFOS). Any person over the age of 16 may participate in these voluntary pension funds by establishing an individual account for each person. The main difference between VPF and VPFOS is that the latter operate under collective agreements and are negotiated according to the participants.

The value of Bulgaria's pillar II and III assets on 31.12.2017 was EUR 6.51 billion. Regarding the market share of private pension funds, the supremacy is held by UPF funds with a share of 83.26 percent, while PPF shares a rate of 8.33 percent, VPF a rate of 8.30 percent, on the last positioning the VPFOS funds with a 0.11 percent share.

Conclusions

Because of demographic factors, the vast majority of EU countries aim to increase the retirement age for both men and women. This decision is largely based on a decline in birth rates in the last decade and a downward trend in the number of inhabitants predominantly in the countries of Central and Eastern Europe.

In Romania, a potential restructuring of the pension system is being analyzed by diminishing or even dismantling the pension pillar II, and measures for decreasing contributions to the pillar II pension fund have already been implemented.

One of the main factors that affected the countries of the former Soviet Union or countries that functioned under the communist regime was linked to the state monopoly under the single pension system (the PAYG system) and the long period of adaptation to social and economic changes in the European and global environment (the emergence of investment companies, private pension funds, etc.).

Although the overall trend generated by globalization is to streamline the pension system to deliver positive returns for taxpayers and generate added value for each country's GDP, each approached country adjusts its pension system to meet specific needs as well as the specifics of the population and the national economy. An example is Poland, which in the next period aims at reforming the entire pension system based on the dismantling of the current Pillar II (OFE) and the introduction of a new Occupational Scheme (PPK) pension scheme.

Investments made by private pension funds on domestic and international capital markets generate economic benefits both from the point of view of contributing to the country's GDP and stimulating economic activity by financing private capital and developing the business environment. Private

pension funds offer an investment alternative for both the taxpayers concerned and institutional investors seeking stable returns.

Managing a country's pension system is a mix of government policies that central administrations aim to create long-term profitability and stability preconditions while aligning with management policies and global trends. As a result, each country determines the structure of the pension system according to its needs as well as the economic situation at regional, European or world level.

Notes

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References

Aegon Pensii
2018, July 15
Retrieved from https://www.aegon.ro/siteassets/media/pensii-private-docs/rapoartele-fondului-vital/2017/2017_raport_web_participanti_vital.pdf
Allianz-Țiriac Pensii Private
2018, July 15
Retrieved from https://www.aztpensii.ro:8888/e_web/san/rap_web/files/ADMINISTRATOR/2017/Situatie_financiara/Sit_Fin_ADM_2017.pdf
Anghel, M. G., & Anghelache, C.
2018
Analysis of the evolution of the number of pensioners and pensions in Romania. *Theoretical and Applied Economics Volume XXV, No. 2(615), Summer*, 187-194.
Autoritatea de Supraveghere Financiară
2018, july 15
Retrieved from https://asfromania.ro/csspp/uploads/files/iulie-2013-tabel-p3_rwji.pdf
Autoritatea de Supraveghere Financiară
2018, July 15
Retrieved from https://asfromania.ro/informatii-publice/statistici/statistici-pensii/pilonul-ii/rate-de-rentabilitate
Autoritatea de Supraveghere Financiară
2018, July 15
Pensiile Private în România. Retrieved from http://m.bursa.ro/_documente/fisiere_articole/335437.pdf
Banca Națională a României
2018, July 15
Raport statistic. București: BNR. Retrieved from http://www.bnr.ro/Raport-statistic-606.aspx
BCR Pensii
2018, July 15
Retrieved from https://pensiibcr.ro/ro/utile/pensia-obligatorie-pilon-2/rapoarte/situatii-financiare
BRD Pensii
2018, July 15
Retrieved from https://www.brdpensii.ro/uploads/2018/FPAP_BRD_structura_detaliata_a_portofoliului_la_31.12.2017.pdf
Bulgarian Financial Supervision Authority
2018, July 14
Suplimentary pension insurance statistical data. Retrieved from http://www.fsc.bg/en/supervised-entities/statistics/social-insurance-market-statistics/2017/
Croatian Financial Services Supervisory Authority
2018, July 15
Statistics. Retrieved from https://www.hanfa.hr/publications/statistics/#section2

Generali Pensii
2018, July 15
Retrieved from https://pensii.generali.ro/pensii_obligatorii/Situatii%20Financiare%202017%20-%20F.P.A.P.%20ARIPI.pdf
Havay, D., & Konecsny, J.
2011
The relationship between risk and return in the light of the hungarian private pension system`s performance. International Journal of Economics and Finance Studies: 2011; 3(1), 65-72.
Metropolitan Life
2018, July 15
Retrieved from http://www.metropolitanlife.ro/content/dam/alico/romania/ro/home/assets/pdf/Pensii-P2/An2017/Situatii_financiare_anuale_la_31_12_2017_METROPOLITAN_LIFE_SAFPAP_SA.pdf
Ministerul Muncii și Justiției Sociale
2018, July 15
Retrieved from
http://www.mmuncii.ro/j33/images/Documente/protectie_sociala/pensii/2016_Despre_sistemul_de_pensii_Romania.pdf
Polish Financial Supervisory Authority
2018, July 14
Reports and Analysis of Pension System. Retrieved from
https://www.knf.gov.pl/en/REPORTS_AND_ANALYSIS/Pension_system/Monthly_data_pension_funds_market

ASSESSING MANAGERS' COMPETENCIES OF GREAT LEADERS

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Abstract

Purpose *– The paper aims to identify managers' profile by considering the six core competencies of a great leader proposed by Dr. Gerry Bell: the Entrepreneur, the Competitor, the Producer, the Stabilizer, the Team Builder, and the Creator.*

Methodology/approach *– A survey was conducted on a sample of Romanian managers based on a face-to-face questionnaire. The six leadership competencies are reflected in the questionnaire by 120 items. Based on individual scores, the average score for each competence was calculated.*

Findings *– The results of this study show, for the Romanian data, the predominant manifestation of the Entrepreneur core competence, in close relationship with other competencies.*

Research limitations/implications *– The research could be extended by carrying out similar studies on managers' profile and comparing the results in time and space.*

Practical implications *– Managers with leadership skills can shape the organization's vision in order to achieve long-term growth and advancement. Leaders are strategic and they build organizations by creating an environment of innovation and constant improvement.*

Originality/value *– The information obtained can be useful for understanding the transition process from manager to leader within an organization.*

Key words: *leadership, personality, competencies*

Introduction

In order to contribute to the organization's development, managers should have leadership skills and be capable of planning, organizing, conducting and controlling. Managers should have a good understanding of human relations and human resource management, of management control and of business vision on the long-term (Jaba, 2007).

Many studies have analysed the relationship between personality, leadership and leader performance (Barrick and Mount, 1991; van Eeden, Cilliers, and van Deventer, 2003; Andersen, 2006; Michel and LeBreton, 2011; Yahaya, et al., 2011; Deinert, et al., 2015). Different models have been used in the literature for defining parameters in human personality. According to McCrae and Costa (1987), the Big Five Personality traits are Openness to experience, Conscientiousness, Extraversion, Agreeableness, and Neuroticism. The Keirsey and Bates (1984) model of personalities classify people into four categories of temperaments: Artisans, Guardians, Rationals, and Idealists. The Myers-Briggs personality type indicator (Furnham, 1996; Hammer and Barger 1996) enables the classification of a person's traits into one of the 16 personality categories defined according to four dichotomous types: Extrovert (E) versus Introvert (I); Sensing (S) versus Intuitive (N); Thinking (T) versus Feeling (F); and Judging (J) versus Perceiving (P). The personality categories are useful for matching a person to a job or a task (Cohen, Ornoy, and Keren, 2013).

In this study the managers' profile is identified by considering the six core competencies of a great leader proposed by Dr. Gerard Bell (Bell Leadership Institute): the Entrepreneur (initiator and developer), the Competitor (assertive and honest), the Producer (focus on getting things done and organized), the Stabilizer (recovers quickly from mistakes and failures, and has confidence), the Team Builder (good listener and supportive), and the Creator (innovative and flexible).

Data and method

Data were obtained from a diverse managerial sample that includes 122 employees with managerial position in their company. The survey was performed on several Romanian companies from north-east and central regions of Romania for 2018. The sample has the following demographic data: mean age – 50.07 years; male – 68.9 percent; female – 31.1 percent; seniority 1-5 years, 6-10 years, 11-15 years, and over 15 years – 6.6 percent, 11.5 percent, 9.8 percent, and 72.1 percent; activity field manufacturing, services, education and other – 36.9 percent, 15.6 percent, 31.1 percent, and 16.4 percent.

The questionnaire was designed in a simple way including 120 questions that correspond to the six core competencies of the great leaders and a short section of socio-demographic questions.

The evaluation scale measures the extent to which a certain assessment reflects the manager's personality. The seven Likert-type scale responses are 1-Very untrue for me, 2-Untrue for me, 3-Somewhat untrue for me, 4-Neutral, 5-Somewhat true for me, 6-True for me, 7-Very true for me.

In order to verify if the managers' competencies are measured in a useful way and to get an overall index of the internal consistency of the scale as a whole, the reliability analysis was applied. Reliability analysis allows the study of properties of measurement scales and items that compose the scales. The Cronbach's Alpha coefficient based on the average inter-item correlation measures the internal consistency of the scale and the strength of association among the items.

Due to the fact that the items in the questionnaire define different competencies, the reliability analysis was run distinctly on each set of items. The Alpha coefficient ranges from 0 to 1. The higher the value of the Alpha coefficient is, the better the reliability of the scale, and the higher the internal consistency of the items. If the Alpha coefficient is higher than 0.70, then the set of items measures the same concept, the strength of association is good, and the consistency of the measurement scale is also good. According to Zikmund (2003) and DeVellis (2012), if the result of Cronbach's Alpha is more than 0.60, the research is acceptable.

Table 1 shows the reliability test of the research. The Alpha coefficient shows that the internal consistency of items is good, and that, based on the six core competencies we can identify the managers' personality. The sets of items defining the Producer and Competitor competencies measure most accurately the personality characteristics, as they have the highest Cronbach's Alpha values.

Table 1. Reliability test for great leaders' core competencies

Scale	Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	Comments
Entrepreneur (20 items)	0.524	0.611	The value of Cronbach's Alpha increases only slightly by deleting 4 items, but the increase is not important so as to accept the item deletion.
Competitor (20 items)	0.787	0.782	The value of Cronbach's Alpha increases only slightly by deleting 3 items, but the increase is not important so as to accept the item deletion.
Producer (20 items)	0.640	0.621	The value of Cronbach's Alpha increases only slightly by deleting 6 items, but the increase is not important so as to accept the item deletion.
Stabilizer (19 items)	0.637	0.683	The value of Cronbach's Alpha increases only slightly by deleting 3 items, but the increase is not important so as to accept the item deletion.
Team Builder (21 items)	0.739	0.752	The value of Cronbach's Alpha increases only slightly by deleting 3 items, but the increase is not important so as to accept the item deletion.
Creator (20 items)	0.769	0.755	The value of Cronbach's Alpha increases only slightly by deleting 6 items, but the increase is not important so as to accept the item deletion.
Overall (120 items)	0.889	0.888	The value of Cronbach's Alpha increases only slightly by deleting 16 items, but the increase is not important so as to accept the item deletion.

By cluster analysis, managers with similar competencies are organized into homogeneous groups. Cluster analysis is an exploratory data analysis tool which allows to classify empirically the observations. Cluster analysis simply discovers natural structures in data. The goal is that the observations within a group be similar to one another and different from observations in other groups. Each cluster may be analyzed independently and the data may by synthetically presented by describing each cluster and thus creating a common profile of the managers in each group. Data by clusters are presented as mean ± standard deviation or frequency. Student's t-test for normally distributed variables and the Chi Square test statistic for categorical variables were used to perform univariate analysis. A p value < 0.05 was considered statistically significant.

The influence of the socio-demographic characteristics on the average scores corresponding to managers' competencies is verified using the general linear models. The variation of the average scores for the main competencies under the influence of socio-demographic characteristics is shown graphically.

Results

In order to identify the presence of the six core competencies of a great leader among the managers in our sample, we have calculated for each individual, the average score for each set of items defining a certain competence. Therefore, we have obtained six average scores for each manager.

It can be noticed that managers have to a large extent all the competencies of a great leader, as the average score is high (above four on a seven Likert-type scale) for five of the six core competencies. However, some of the competencies are more prevalent than others, and among all six, the Entrepreneur is undoubtedly the competence that managers possess to the highest level.

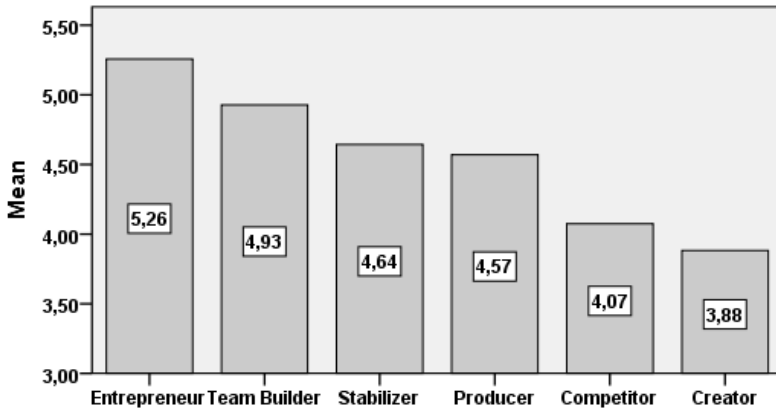

Figure 1. The hierarchy of the six core competencies on being a great leader

The managers in the sample identify themselves to the highest extent as having the entrepreneur profile (the average score on the 20 items defining the Entrepreneur competence is equal to 5.26). The second competence that is characteristic to the interviewed managers is being a Team Builder; the average score on the 21 items defining the Team Builder competence is equal to 4.93. The third and fourth places correspond to the Stabilizer and Producer competencies that manifest within the personality of the managers; the average score on the 19 items defining the Stabilizer competence and the average score on the 20 items defining the Producer competence are equal to 4.64 and 4.57, respectively. The managers manifest their Competitor profile to a less evident extent; the average score on the 20 items defining the Competitor competence is equal to 4.07, while the Creator profile is the lowest present among the managers interviewed in our sample; the average score on the 20 items defining the Creator competence is equal to 3.88.

Therefore, the Entrepreneur and Team Builder are the best defined profiles among the managers of our sample, according to the average scores recorded for the six core competences of great leaders.

With the aim of identifying the differences in the intensity of manifesting all the six competencies of great leaders, we have identified clusters of managers according to the core competencies and also to the set of demographic characteristics.

The criteria for defining the clusters of managers are presented according to their importance in identifying the membership of managers into distinct groups in Figure 2. Among the six core competencies, the Creator and Competitor competencies are the most important predictors of cluster membership, while the Entrepreneur and Team Builder are the less important predictors in identifying the cluster membership.

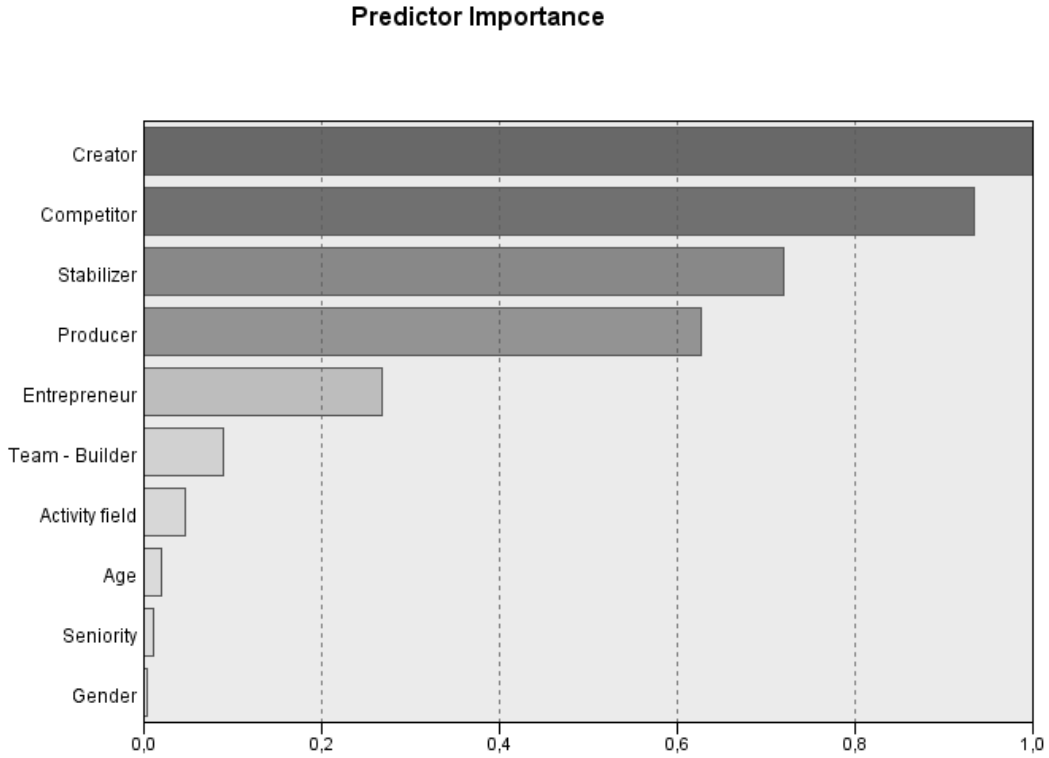

Figure 2. The hierarchy of the six core competencies on being a great leader by their importance in predicting the cluster membership

The managers are classified, according to the six competencies of great leaders into two clusters: cluster 1 is the largest cluster by size – 73 managers, 59.8 percent of the overall sample, and cluster 2 is the smallest cluster by size – 49 managers, 40.2 percent of the overall sample.

There are important differences between the managers in the two clusters in relation to the set of the six competencies of the great leaders. Therefore, when comparing the average values of the two clusters, for the six core competencies, it can be noticed that managers in cluster 1 show in a higher extent the profile of great leaders as compared to the managers in cluster 2. In Table 2 data by clusters and by overall sample are presented as mean ± standard deviation or frequency.

The results show that, for all the six competencies, the average scores are higher for cluster 1 than the average scores for cluster 2. Consequently, we can consider that managers with a high profile of great leaders are grouped into cluster 1, while the managers with a low profile of great leaders are grouped into cluster 2. The mean values and the standard deviation for each competence, by clusters are presented in Table 2.

Entrepreneur and Team Builder competencies are more evident among the managers in both clusters.

The scores for the six competencies follow a normal distribution, as indicated by the Shapiro-Wilk test, for which the probabilities are higher than the assumed risk of 5 percent. Assuming the normal distribution for the average scores of the six competencies, the Student t test is used to compare the differences between the two clusters. A p value < 0.05 was considered as statistically significant.

The Student test shows that the difference between the mean scores for the six competencies, by clusters, are statistically significant. Therefore, the managers from cluster 1 have statistically higher scores for the six competences, so they manifest to a larger extent the competencies of great leaders.

Table 2. The clusters'profile according to the six competences of great leaders

Managers' Competencies of Great Leaders	Overall sample (n=122)	Cluster 1 (n_1=73)	Cluster 2 (n_2=49)	P value
Entrepreneur; Mean ± Std. Dev.	5.26 ± 0.48	5.39 ± 0.47	5.05 ± 0.41	0.000
Team – Builder; Mean ± Std. Dev.	4.93 ± 0.60	5.02 ± 0.58	4.79 ± 0.60	0.041
Stabilizer; Mean ± Std. Dev.	4.64 ± 0.56	4.90 ± 0.43	4.26 ± 0.50	0.000
Producer; Mean ± Std. Dev.	4.57 ± 0.54	4.80 ± 0.46	4.22 ± 0.44	0.000
Competitor; Mean ± Std. Dev.	4.07 ± 0.75	4.46 ± 0.57	3.50 ± 0.59	0.000
Creator; Mean ± Std. Dev.	3.88 ± 0.69	4.25 ± 0.56	3.34 ± 0.46	0.000
Managers' characteristics	**Overall sample**	**Cluster 1**	**Cluster 2**	**P value**
Age; Mean ± Std. Dev.	50.07 ± 11.099	49.53 ± 11.02	50.55 ± 11.28	0.515
Gender				
Male (0)	68.9%	68.5%	69.4%	0.917
Female (1)	31.1%	31.5%	30.6%	
Seniority				
1 – 5 years (0)	6.6%	8.2%	4.1%	
6 – 10 years (1)	11.5%	12.3%	10.2%	0.709
11 – 15 years (2)	9.8%	8.2%	12.2%	
over 15 years (3)	72.1%	71.2%	73.5%	
Activity field				
Manufacturing (0)	36.9%	30.1%	46.9%	
Services (1)	15.6%	17.8%	12.2%	0.191
Education (2)	31.1%	31.5%	30.6%	
Other (3)	16.4%	20.5%	10.2%	

Chi Square test for categorical variables was used to perform univariate analysis. There are no statistically significant differences between the managers in the two clusters by age, gender, seniority and field of activity.

In order to highlight the differences among specific groups of managers defined according to demographic characteristics, the GLM procedure was applied. In this analysis, the average scores for the most present competencies, namely Entrepreneur and Team Builder, have been considered. The main results are presented graphically in Figures 3 – 6.

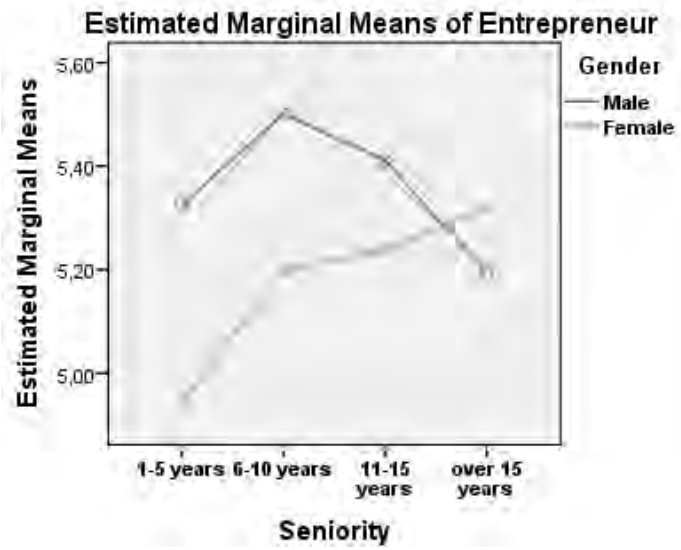

Figure 3. The variation in the average scores of the Entrepreneur competence by gender and seniority

The estimated marginal means for Entrepreneur increases in relation to seniority (years employed), both for women and men. An exception can be observed for the group with seniority above 15 years, as the Entrepreneur average score for female mangers increases while for male managers it starts to decrease. We may also note an interaction effect between seniority and gender on the average score for Entrepreneur competence. For that reason, we can conclude that female managers gain more Entrepreneur competencies as they become more experienced in managerial positions. For this

specific competence, male managers are more endowed than their female counterparts, at the beginning and during the middle part of their careers in management.

When analyzing the effects of activity field and gender on the Entrepreneur competence scores, it can be highlighted that, in general, the estimated marginal scores are higher for men than for women. However, the female managers employed in Education have higher Entrepreneur competencies than their male counterparts. For both genders, the highest scores for Entrepreneur competencies are evident in managerial positions in Manufacturing and Services. The most important gender gap can be noticed for Other activities, where the estimated marginal mean of Entrepreneur competence for male managers is obviously higher than the mean for female managers.

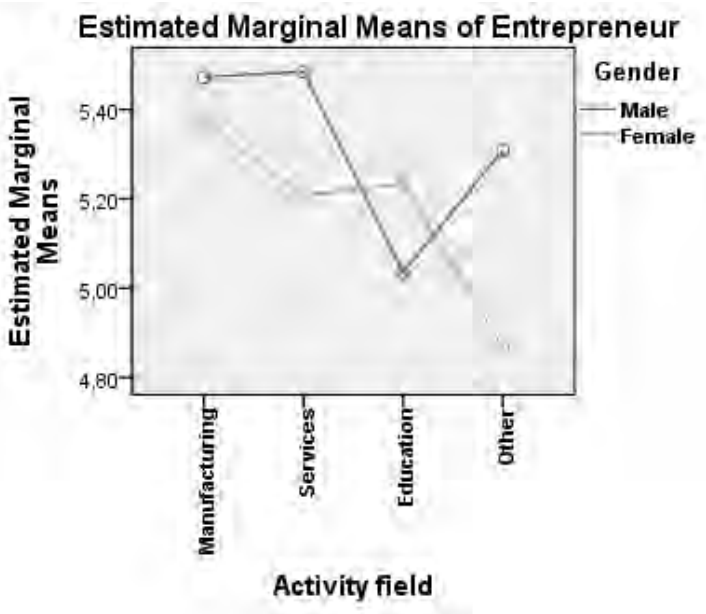

Figure 4. The variation in the average scores of the Entrepreneur competence by gender and activity field

The most important gender gap for estimated marginal mean scores of Team Builder competence can be noticed for the early career period and also for the Manufacturing and Education fields. The Team Builder competence is more prominent in male managers with a small seniority of 1 to 5 years than in female managers with the same seniority level as seen in Figure 5.

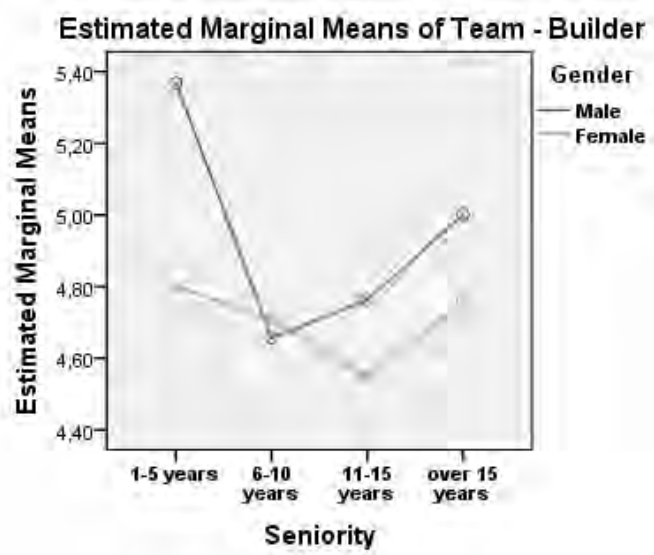

Figure 5. The variation in the average scores of the Team Builder competence by gender and seniority

Male managers employed in Other activities, in Services and in Manufacturing have the highest estimated marginal means for Team Builder competencies, compared to their female counterparts. However, the gender gap is reversed in favor of female managers for the Education field. The women employed in managerial positions in Education have stronger Team Builder competences as compared to their male counterparts.

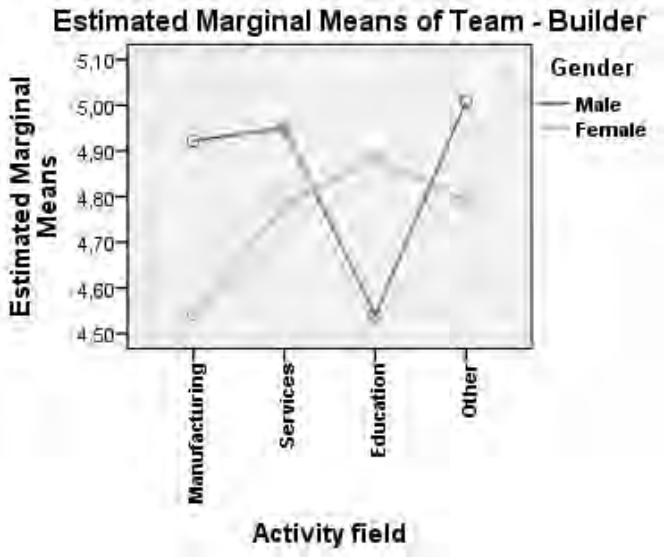

Figure 6. The variation in the average scores of the Team Builder competence by gender and activity field

There are significant differences in managers' personality by simultaneous variation in the social-demographic characteristics, such as gender, seniority and activity field.

Conclusions

This paper presents an empirical, exploratory study based on a survey of 122 managers. The main survey findings show that:

1. The interviewed managers have leadership competencies, but the intensity of manifesting these competencies is different within the sample. Among the six core competencies of great leaders, the Entrepreneur and the Team Builder competencies are the most prominent.
2. There can be identified two groups of managers: cluster 1 representing 59.8 percent of the overall sample is formed of managers with high values for the six core competencies; this cluster is formed of great leaders; and cluster 2 representing 40.2 percent of the overall sample is formed of managers that have fewer competencies related to being great leaders.
3. The results were found for both women and men. However, female managers gain more Entrepreneur competencies as they become more experienced in managerial positions, while male managers are more endowed at the beginning and during the middle part of their managerial careers.
4. For both genders, the highest scores for Entrepreneur competencies are evident in managerial positions in Manufacturing and Services. Nonetheless, women employed in managerial positions in Education have stronger Entrepreneur and Team Builder competences as compared to their male counterparts.

The findings of this study have important practical implications. The findings contribute to better characterization of the management population and the relationship between managers' competencies of being great leaders and their socio and demographic profile.

References

Andersen, J. A.
2006
"Leadership, personality and effectiveness." The Journal of Socio-Economics, 35: 1078–1091
Barrick, M. R., and M. K. Mount
1991
"The big five personality dimensions and job performance : a meta-analysis." Personnel Psychology, 44: 1-26
Cohen, Y., H. Ornoy, and B. Keren
2013
"MBTI Personality Types of Project Managers and Their Success: A Field Survey." Project Management Journal, 44(3): 78–87.
DeVellis, R. F.
2012
Scale development: Theory and applications. Los Angeles: Sage
Deinert, A., A. C. Homan, D. Boer, S. C. Voelpel, and D. Gutermann
2015
"Transformational leadership sub-dimensions and their link to leaders' personality and performance." The Leadership Quarterly, 26(6): 1095–1120
Eeden, R. van, F. Cilliers, and V. Deventer, van
2003
"Leadership styles and associated personality traits : Support for the conceptualisation of transactional and transformational leadership." South African Journal of Psychology, 38(2): 253–267
Furnham, A.
1996
"The big five versus the big four: The relationship between the Myers-Briggs Type Indicator (MBTI) and NEO-PI five factor model of personality." Personality and Individual Differences, 21(2): 303–307.
Hammer, A. L., and N. J. Barger
1996
MBTI applications: A decade of research on the Myers-Briggs Type Indicator. Palo Alto, CA: Consulting Psychologists Press.
Jaba O.
2007
Production and Operations Management. Iasi, Sedcom Libris
Keirsey,D., and M. Bates
1984
Please understand me: Character and temperament types. Del Mar, CA: Gnosology.
McCrae, R. R., and P. T., Jr. Costa
1987
"Validation of the five-factor model of personality across instruments and observers." Journal of Personality and Social Psychology, 52:81–90.
Michel, J. S., and J. M. LeBreton
2011
"Leadership coherence : An application of personality coherence theory to the study of leadership." Personality and Individual Differences, 50: 688–694
Yahaya, N., M. Aslan, B. M. Taib, J. Ismail, Jand Z. Shariff
2011
"Relationship between leadership personality types and source of power and leadership styles among managers." African Journal of Business Management, 5(22): 9635-9648
Zikmund, W. G.
2003
Exploring Marketing Research. 8th edition, South-Western, Ohio

SCIENTIFIC RESEARCH DEDICATED TO THE INTELLECTUAL PROPERTY PROTECTION

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Abstract

Purpose *–This paper purpose is to highlight the global innovation index which provides detailed metrics about the innovation performance of 127 countries and economies around the world, and the EPO statistics whit the five-year overview annual report about the total European patent, the geographic origin of the European patent applications, the 10 top countries annual on European patent application and the top 10 technical fields based on European patent applications*

Methodology/approach *- The approach is based on reports, statistics and graphics presentation which provides detailed metrics about the innovation performance of the studied countries and economies around the world.*

Findings *– Switzerland, Sweden, the Netherlands, the USA and the UK are the world's most-innovative countries, while a group of nations including India, Kenya, and Viet Nam are outperforming their development-level peers, according to the Global Innovation Index 2017 co-authored by Cornell University, INSEAD and the World Intellectual Property Organization Romania, takes the 42 position between Croatia and Turkey.*

Research limitations/implications *– In complex product industries, firms often do not have proprietary control over all the essential complementary components of at least some of the technologies they are developing.*

Practical implications *– In a "knowledge-based" economy, intellectual property systems are constantly challenged by the advance of technology, a process that among other things creates new artifacts to which the necessarily backward-looking patent system must respond.*

Originality/value *–This paper summarize the worldwide status of patents, innovations and trademarks*

Key words: *patent, innovation, intellectual property.*

Introduction

Many authors like Andriessen (2004) and Ricceri (2008) have tried to find a proper definition of the intellectual capital concept. Thomas A. Steward (1999, p.11) considers that "Intellectual capital is intellectual material – knowledge, information, intellectual property, experience – that can be put to use to create wealth".

Intellectual property is an idea that should be observed in close relation to the intellectual capital concept. Three of the most powerful districts in the world have conducted studies that have brought attention to this concept: Japan, The United States, and Europe.

In Japan, Hiroyuki Itami, in the paper "Mobilizing Invisible Assets" published in 1987 (Hiroyuki & Roehl, 1987), points out that successful strategies of Japanese companies depend on intangible assets like know-how, brand visibilities, customer databases, but also personal, tangible and financial assets. It highlights, in the same context, the strategic importance suitable to both the company's internal and external environment.

In the United States, Rumelt, Wemerfelt, and Penrose, as economists, formulated different theories about the operation of commercial firms with intangibles, which have been crystallized by David Teece (2000), from the University of Berkeley.

In Europe, contributions in the first phase of intellectual capital development had Karl Erik Sveiby (1997), Edvinsson and Malone (1997), Roos, Dragonetti, and Edvinsson (1997). Intellectual property is a legal term form which allows the owner to control certain intangibles like ideas or phrases.

According to the Romanian Copyright Office (ORDA, 2017), "Intellectual Property, abbreviated IP, refers to mind creations: inventions, literary works, artistic works, symbols, names, images and designs used in commercial activities. The owner of intellectual property can control and be rewarded for its use and so, this encourages innovation and creativity for the benefit of humanity".

The industrial property law essentially consists of the holder powers regarding the protection title granted on the territory and a limited time performing, producing and exploiting the industrial property in question as well as to prevent third parties to reproduce, the object's manufacture and use. In other words, it is about conferring a statutory right to a monopoly of the object exploitation of the industrial property in the holder's favor, which is time and space limited (Țîțu, 2016).

In the 1st article, paragraph 2 of the Paris Convention from 1883 on the protection of industrial property, utility models are presented which contribute to the protection of inventions which are based on a low or absent inventive activity, but also those who do not meet the necessary conditions for obtaining a patent. Yet today, there are utility models which subsequently lead to obtaining patents, and so the utility model is considered as "petty patents" and is recognized in certain national offices including State Office For Inventions And Trademarks (OSIM, 1997).

The Law no. 64/1991, republished, Article 1, paragraph 1, shows that "an invention's rights are recognized and protected in Romania by granting a patent by OSIM, as provided by law" (Romanian Parliament, 1991). We cannot forget about the intellectual property right which is called brand. A brand is a sign or combination of signs that distinguish the organization goods or services from those of others. Such signs may consist of words, letters, pictures, shapes or colors, but also combinations thereof (Romanian Parliament, 1991).

The World Intellectual Property Organization

The World Intellectual Property Organization (WIPO) is the global forum for intellectual property policy, services, information and cooperation. As a specialized agency of the United Nations, WIPO goal is to help all of its 191 member states develop a more balanced international IP legal framework to reach society's ever changing needs. It delivers business services for obtaining IP rights in several countries while resolving disputes. It delivers capacity-building programs to help developing countries benefit from using IP in the same time that it provides free access to specialized knowledge banks of IP information (WIPO, 2018).

The European Patent Office

The European Patent Office (EPO) is one of the two organs of the European Patent Organization (EPOrg), the other being the Administrative Council. The EPO acts as executive body for the Organization while the Administrative Council acts as its supervisory body as well as, to a limited extent, its legislative body. The actual legislative power to revise the European Patent Convention lies with the Contracting States themselves when meeting at a Conference of the Contracting States (https://en.wikipedia.org/wiki/European_Patent_Office, June 6, 2018).

Patents given out by The EPO represent the European states in which the applicants desire to patent their inventions. Because in most European states an EPO patent application cost approximately three times as much as national applications, the EPO patents come with significant cost advantages for inventions that require protection in a number of European markets. However the centralization of application and examination also allows a centralized legal challenge: under the European Patent

Convention (EPC), any third party can use an opposition procedure to challenge the granted patent within nine months after the granting date for all of the designated states, instead of having to pursue legal proceedings in each of the European nations designated in the patent. (Stuart et al., 2002, pp. 3)

Patenting activity is considerable and has grown substantially since the early 1980's in the U.S. The total number of U.S. patent grants has increased 78% to 101,419 between 1983 and 1995, and for U.S. corporations alone it has increased 72% to 44,035 (National Science Board, 1998, p. A-373).

Inventions may also be related to one another if they are economic complements when, to create a single commercializable product, numerous separately patentable inventions need to be combined, which is commonly the case in complex product industries. In such settings, holding a patent on one of these elements can block the acquisition of exclusive property rights over the commercializable invention as a whole. (Wesley et al., 2000)

A patent protection for European member states can be gained through completing many national applications at the respective national patent offices or by completing one EPO patent application at the European Patent Office.

The European patent system has a post-grant procedure by which the authenticity of the patent can be challenged by other parties. The interested parties can file suit in court over infringement and authenticity (with a few restrictions as to when a suit can be filed).

In the last decade, the national patent courts have begun taking more evidence and decisions from litigation in other EC nations seriously, but no systematic study has analyzed such legal “spillover” effects (Stauder 1996). Other spillover effects connect the results of oppositions and those of subsequent litigation. The national authorities involved with the adjudication of such suits can site previous proceedings, which sometimes makes it more difficult for a plaintiff to win a national validity suit after they have lost an EPO opposition proceeding. But no systematic analysis of these spillovers has been undertaken as of yet.

In this paper, are summarized the global innovation index reports about the ranking of world economies’ innovation capabilities and results and also the regional innovation leaders' situation, by analyzing 127 countries. In the EPO statistics, the five-year overview annual report about the total European patent is presented. Also, it will be presented the geographic origin of the European patent applications, the 10 top countries annual on European patent application and the top 10 technical fields based on European patent applications.

Global Innovation Index

The Global Innovation Index provides detailed metrics about the innovation performance of 127 countries and economies around the world. Its 81 indicators explore a broad vision of innovation, including political environment, education, infrastructure and business sophistication. This year’s report reviews the state of innovation in agriculture and food systems across sectors and geographies. Chapters of the report provide more details on this year’s theme from academic, business, and particular country perspectives from leading experts and decision makers. Published each year since 2007, the GII has become a leading benchmarking tool for business executives, policy makers and others seeking insight into the situation of innovation worldwide. Policymakers, business leaders and other stakeholders use the GII to constantly evaluate progress. This year’s study benefits from the experience of its Knowledge Partners, Confederation of Indian Industry, PwC’s Strategy and the National Confederation of Industry (CNI) and Brazilian Micro and Small Business Support Service (Sebrae), as well as of an Advisory Board of international experts.

The center of the GII Report is made up of a ranking of world economies’ innovation capabilities and results. Recognizing the key role of innovation as a catalyst of economic growth and prosperity, and the need for a wider horizontal vision of innovation applicable to developed and emerging economies, the GII includes indicators that reach beyond the traditional ways of measuring innovation such as the level of research and development.

In order to support the global innovation debate, to guide polices and to highlight good practices, metrics are required to assess innovation and related policy performance. The GII strives to create an environment in which innovation factors are under continually evaluated, including the following features:

- 127 country/economy profiles, which include data, ranks, and strengths and weaknesses;
- 81 data tables for indicators from over 30 international public and private sources, 57 of which are hard data, 19 composite indicators, and 5 survey questions;
- A transparent and replicable computation methodology including 90% confidence intervals for each index ranking (GII, output and input sub-indices) and an analysis of factors affecting year-on-year changes in rankings.

Switzerland, Sweden, the Netherlands, the USA and the UK are among the top of the world's most-innovative countries, while a separate group of nations including India, Kenya, and Viet Nam are outperforming their development-level peers, according to the Global Innovation Index 2017 co-authored by Cornell University, INSEAD and the World Intellectual Property Organization (WIPO, 2018).

Some key findings have shown the rise of India as an up and coming innovation center in Asia, as well as a high innovation performance in Sub-Saharan Africa comparable to the development and an opportunity to improve innovation capacity in Latin America and the Caribbean.

In 2017, Switzerland lead the rankings for the seventh consecutive year, with high-income economies taking 24 of the top 25 spots – with China being the exception at 22. In 2016, China became the first-ever middle income economy to reach the top 25.

"Efforts to bridge the innovation divide have to start with helping emerging economies understand their innovation strengths and weaknesses and create appropriate policies and metrics," said Soumitra Dutta, Dean, Cornell SC Johnson College of Business, Cornell University. "This has been the GII's purpose for more than ten years now." (WIPO, 2018)

Next to innovation powerhouses such as China, Japan, and the Republic of Korea, a group of Asian economies including Indonesia, Malaysia, Singapore, Thailand, the Philippines and Viet Nam are actively working to improve their innovation ecosystems so they to can rank high in a number of important indicators related to education, R&D, productivity growth, high-tech exports, to name a few.

About Romania, by the figure 1 it can be observed that it takes the 42 position between Croatia and Turkey. About the regional innovation leaders, the situation is presented in table 1.

Table 1. The Regional Innovation Leaders (WIPO, 2018)

Regional Innovation Leaders		
Region / Rank	**Country**	**GII 2017 Global Rank**
Northern America		
1	United States of America	4
2	Canada	18
Sub-Saharan Africa		
1	South Africa	57
2	Mauritius	64
3	Kenya	80
Latin America and the Caribbean		
1	Chile	46
2	Costa Rica	53
3	Mexico	58
Central and Southern Asia		
1	India	60
2	Iran, Islamic Republic of	75
3	Kazakhstan	78
Northern Africa and Western Asia		
1	Israel	17
2	Cyprus	30
3	United Arab Emirates	35
South East Asia, East Asia, and Oceania		
1	Singapore	7
2	Republic of Korea	11
3	Japan	14
Europe		
1	Switzerland	1
2	Sweden	2
3	The Netherlands	3

Global Innovation Index 2017 rankings

Country/Economy	Score (0–100)	Rank	Income	Rank	Region	Rank	Efficiency Ratio	Rank	Median: 0.62
Switzerland	67.69	1	HI	1	EUR	1	0.95	2	
Sweden	63.82	2	HI	2	EUR	2	0.83	12	
Netherlands	63.36	3	HI	3	EUR	3	0.93	4	
United States of America	61.40	4	HI	4	NAC	1	0.78	21	
United Kingdom	60.89	5	HI	5	EUR	4	0.78	20	
Denmark	58.70	6	HI	6	EUR	5	0.71	34	
Singapore	58.69	7	HI	7	SEAO	1	0.62	63	
Finland	58.49	8	HI	8	EUR	6	0.70	37	
Germany	58.39	9	HI	9	EUR	7	0.84	7	
Ireland	58.13	10	HI	10	EUR	8	0.85	6	
Korea, Rep.	57.70	11	HI	11	SEAO	2	0.82	14	
Luxembourg	56.40	12	HI	12	EUR	9	0.97	1	
Iceland	55.76	13	HI	13	EUR	10	0.86	5	
Japan	54.72	14	HI	14	SEAO	3	0.67	49	
France	54.18	15	HI	15	EUR	11	0.71	35	
Hong Kong (China)	53.88	16	HI	16	SEAO	4	0.61	73	
Israel	53.88	17	HI	17	NAWA	1	0.77	23	
Canada	53.65	18	HI	18	NAC	2	0.64	59	
Norway	53.14	19	HI	19	EUR	12	0.66	51	
Austria	53.10	20	HI	20	EUR	13	0.69	41	
New Zealand	52.87	21	HI	21	SEAO	5	0.65	56	
China	52.54	22	UM	1	SEAO	6	0.94	3	
Australia	51.83	23	HI	22	SEAO	7	0.60	76	
Czech Republic	50.98	24	HI	23	EUR	14	0.83	13	
Estonia	50.93	25	HI	24	EUR	15	0.79	19	
Malta	50.60	26	HI	25	EUR	16	0.84	8	
Belgium	49.85	27	HI	26	EUR	17	0.67	47	
Spain	48.81	28	HI	27	EUR	18	0.70	36	
Italy	46.96	29	HI	28	EUR	19	0.73	31	
Cyprus	46.84	30	HI	29	NAWA	2	0.74	28	
Hungary	41.74	39	HI	36	EUR	26	0.73	30	
Lithuania	41.17	40	HI	37	EUR	27	0.59	84	
Croatia	39.80	41	HI	38	EUR	28	0.66	52	
Romania	39.16	42	UM	4	EUR	29	0.69	39	
Turkey	38.90	43	UM	5	NAWA	4	0.84	9	
Greece	38.85	44	HI	39	EUR	30	0.56	87	
Russian Federation	38.76	45	UM	6	EUR	31	0.61	75	
Chile	38.70	46	HI	40	LCN	1	0.60	77	
Viet Nam	38.34	47	LM	1	SEAO	9	0.84	10	

Figure 1. Global Innovation Index 2017 rankings (WIPO, 2018)

In this year's edition of the GII, 15 of the top 25 global economies are found in Europe, which is particularly strong in human capital and research, infrastructure, and business sophistication.

European economies rank first in almost half the indicators composing the GII; including knowledge-intensive employment, university/industry research collaboration, patent applications, scientific and technical articles, and quality of scientific publications.

EPO statistics

Questions about sources of economic growth, the rate of technological change, the competitive position of different firms and countries, the dynamism of alternative industrial structures and arrangements all have a tendency to revolve around ideas of differential inventiveness: What has happened to the "underlying" rate of technical and scientific progress? How has it changed over time and across industries and national boundaries? We have, in fact, very few good measures for any of this and are therefore are reduced to pure speculation or to the use of various, only distantly related, "residual" measures and other proxies.

About the annual report 2017 - the five-year overview about the total European patent, the situation is presented in table 2.

Table 2. The annual report 2017 - the five-year overview

	2013	2014	2015	2016	2017
Total European patent filings	265918	274367	279002	297656	310784
Total European patent applications filed with the EPO	148027	152703	160004	159316	165590
Total searches	203393	213008	238077	244689	247503
European patents granted	66712	64613	68419	95940	105635

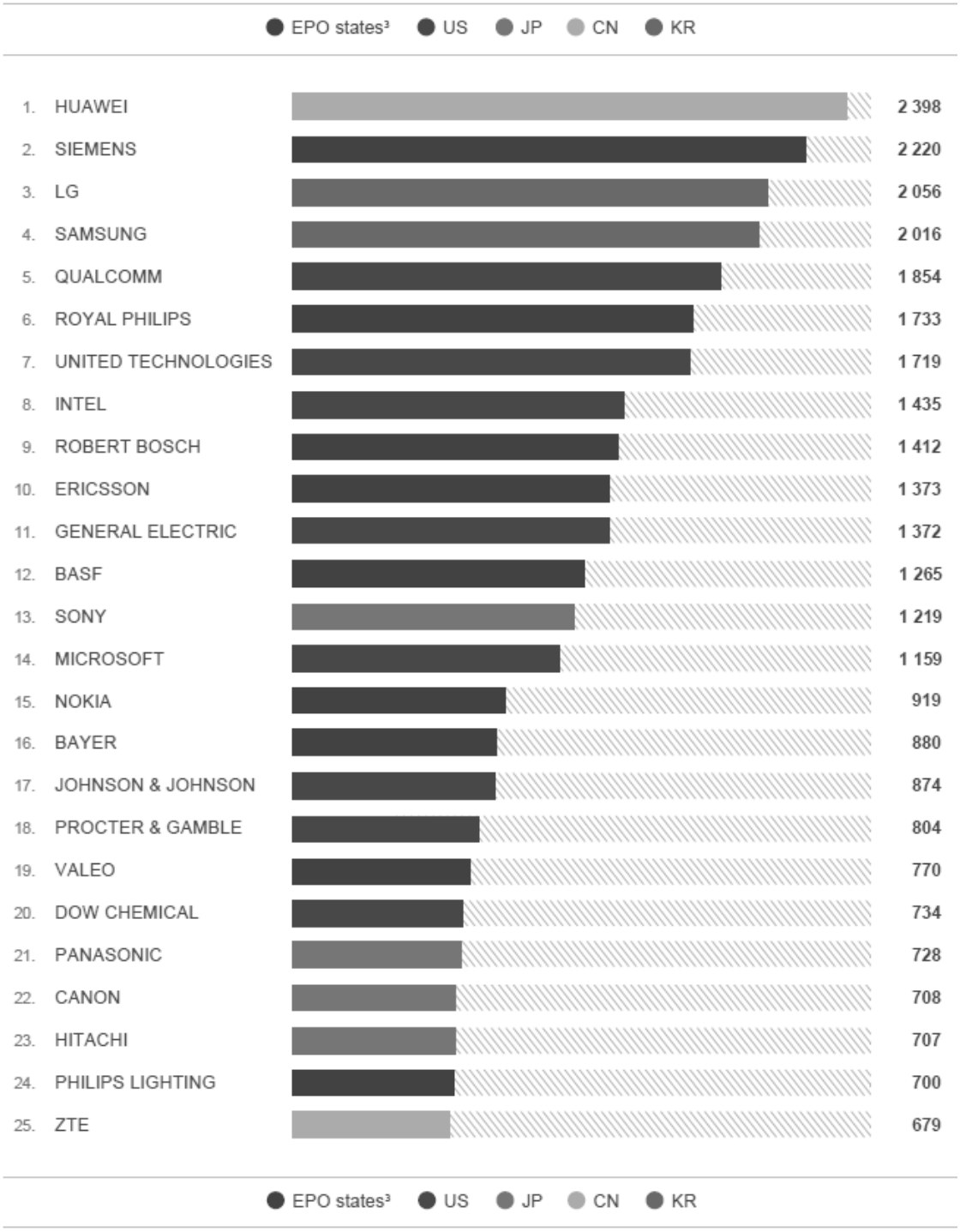

Figure 2. The top 25 applicants (EPO, 2018)

With the mention that the total European patent include direct European filings under the European Patent Convention (EPC) and international (PCT) filings and that the European patent applications

include direct European applications and international (PCT) applications that entered the European phase during the reporting period, in all the cases, in can be seen that the most records are in 2017.

About the category of applicants requesting services from the EPO shows that 69% of them were large companies, 24% were SMEs and individual inventors, and 7% were universities and public research institutes.

The top 25 applicants ranking shows the largest applicants at the EPO, indicating their country of origin (figure 2). As it can be seen here Huawei, Siemens and LG have the most applicants, followed by Samsung and Qualcomm.

In Figure 3 the geographic origin of the European patent applications determined by the country of residence of the first applicant listed on the application form (first-named applicant principle), is presented. By here it result that the US has the biggest percent of 26%, followed by Germany with 15 % and Japain with 13%.

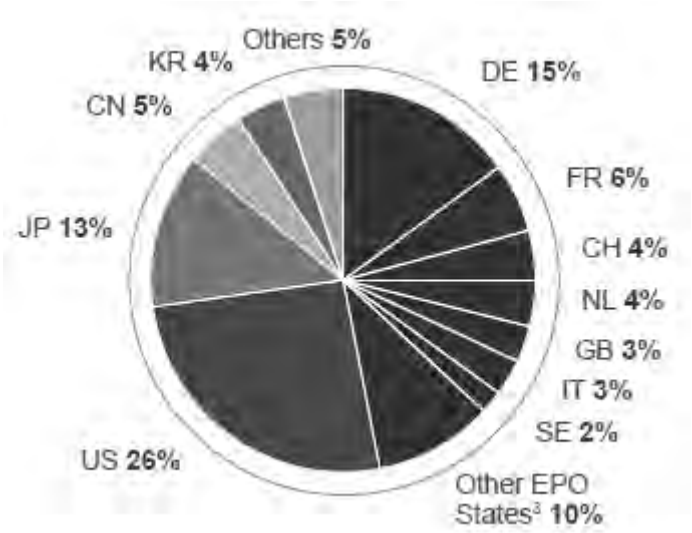

Figure 3. The geographic origin of the European patent applications (EPO, 2018)

After a comparison made on the 10 top countries on European patent application it result the following data, which are presented in table 3.

Table 3. The 10 top countries annual on European patent application (EPO, 2018)

Rank	Country	2016	2017	% change 2017/2016
1	United States	39998	42300	5.8%
2	Germany	25012	25490	1.9%
3	Japan	20986	21712	3.5%
4	France	10504	10559	0.5%
5	China, People's Republic of	7142	8330	16.6%
6	Switzerland	7241	7283	0.6%
7	Netherlands	6857	7043	2.7%
8	Korea, Republic of	6821	6261	-8.2%
9	United Kingdom	5188	5313	2.4%
10	Italy	4172	4352	4.3%

About the top 10 technical fields based on European patent applications with the largest number of applications in 2017 is presented in figure 4. In 2017, these top ten fields represented 53% of the total number of European applications filed.

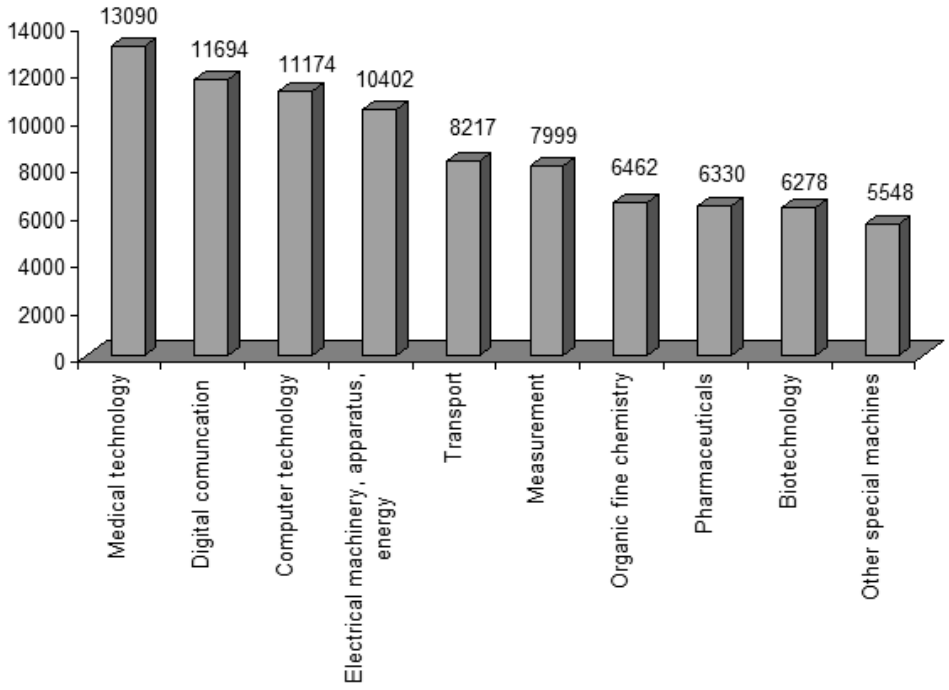

Figure 4. Top 10 technical fields based on European patent applications (EPO, 2018)

Another aspect that must be presented about the EPO statistics is the decisions in oppositions. In this case, anyone can oppose a European patent within a period of nine months from the publication of the grant. The opposition rate (proportionate to the patents which are opposed among those for which this nine months delay expired during the reported period) was 3,7%. In 2017 the EPO issued some 4 070 opposition decisions, in which 73% of these cases the patents were upheld either as granted or reissued in an amended form.

Finally, the customer satisfaction is very important. The EPO monitors customer satisfaction by running regular quantitative surveys with independent research institutes. Below, the top results of these EPO surveys, are presented:

- Customer satisfaction with search and examination services, 80% are satisfied or very satisfied;
- Customer satisfaction with patent administration services, 89% are satisfied or very satisfied.

Discussion and conclusions

In a “knowledge-based” economy, intellectual property systems are often constantly challenged by the advance of technology, a process that among many other things creates new situations to which the necessarily backward-looking patent system must respond. A “knowledge-based” economy also is one in which the high political saturation of national and global intellectual property systems means that they are the focus of political lobbying to strengthen, adapt, or weaken specific features of intellectual property regulation, administration, and law in order to favor particular interests.

In complex product industries, firms often do not have proprietary control over all the essential complementary components of at least some of the technologies they are developing.

Firms hold rights over technologies that others need, and vice-versa, creating a condition of mutual dependence that fosters extensive cross-licensing. One communications equipment manufacturer's executive stated: "Mostly, your patents are used in horse trading. You come together and say, 'Here's our portfolio.' In our industry, things all build on each other. We all overlap on each other's patents. Eventually we come to some agreement: 'You can use ours and we can use yours."

The reasons because the firms are not applying for a patent include (Wesley et al., 2000):

- difficulty in demonstrating the novelty of an invention;
- the amount of information disclosed in a patent application;
- the cost of applying;
- the cost of defending a patent in court;
- the ease of legally inventing around a patent.

References

Andriessen, D.
2004
Making sense of intellectual capital: designing a method for the valuation of intangibles. Amsterdam: Elsevier.

Edvinsson, L. and M.S. Malone
1997
Intellectual capital: Realizing your company's true value by finding its hidden brainpower. New York: Haper Business.

Hiroyuki, I. and T.W. Roehl
1987
Mobilizing invisible assets. Boston: Harvard University Press.

Merges, R.obert P.
1999
"As Many as Six Impossible Patents Before Breakfast: Property Rights for Business Concepts and Patent System Reform," Berkeley High Technology Law Journal 14: 577- 615.

National Science Board
1998
Science and Engineering Indicators 1998, Washington, D.C.: U.S. Government Printing Office.

ORDA
2017
Romanian Copyright Office. Retrieved from https://www.orda.ro.

OSIM
2017
Convention of Paris 1883.
Retrieved from http://www.osim.ro/legis/legislatie/marci/conprotin.htm.

Ricceri, F.
2008
Intellectual capital and knowledge management: Strategic management of knowledge resources. London: Routledge.

Law 64/1991 - Romanian Parliament
1991
Law 64/1991 republished on patents. Retrieved from http://www.osim.ro/legis/legislatie/brevet/lg64_91_rep07.htm.

Stauder, D.
1989
Patent- und Gebrauchsmusterverletzungsklagen in der Bundesrepublik Deutschland, Großbritannien, Frankreich und Italien. Schriftenreihe zum Gewerblichen Rechtsschutz (Vol. 89), 27 Max-Planck-Institut für ausländisches und internationales Patent- Urheber- und Wettbewerbsrecht. Köln.

Stewart, T.A.
1999
Intellectual capital: The new wealth of organizations. London: Nicholas Brealey Publishing.

Stuart J. H. Graham, H. Bronwyn, Dietmar Harhoff, D.C. Mowery
2002
Post-Issue Patent "Quality Control": A Comparative Study of US Patent Re-Examinations and European Patent Oppositions, National Bureau of Economic Research 1050 Massachusetts Avenue, Cambridge, Ma 02138, February 2002.

Sveiby, K.E.
1997
The new organizational wealth: Managing & measuring knowledge-based assets. San Francisco: Berrett-Koehler Publishers.

Teece, D.
2000
Managing intellectual capital. Oxford: Oxford University Press.
Țîțu, M.
2016
Intellectual Property Policy at "Lucian Blaga" University of Sibiu. Journal of Electrical Engineering, Electronics, Control and Computer Science, 2(5), 25-30.
Wesley M. Cohen, R. Nelson, J.P. Walsh
2000
PROTECTING THEIR INTELLECTUAL ASSETS: APPROPRIABILITY CONDITIONS AND WHY U.S. MANUFACTURING FIRMSPATENT (OR NOT), Working Paper 7552, http://www.nber.org/papers/w7552, NATIONAL BUREAU OF ECONOMIC RESEARCH, 1050 Massachusetts Avenue, Cambridge, MA 02138, February 2000.
WIPO
2008
Intellectual Property Handbook: Policy, Law and Use. Chapter 2: Fields of Intellectual Property Protection WIPO 2008
WIPO
2008
“What is Intellectual Property” Handbook: WIPO Publication No. 450(E) ISBN 978-92-805-1555-0 Parameter error in {{isbn}}: Invalid ISBN., available:
http://www.wipo.int/edocs/pubdocs/en/intproperty/450/wipo_pub_450.pdf
EPO
2018
https://www.epo.org/about-us/annual-reports-statistics/annual-report/2017.html
https://en.wikipedia.org/wiki/European_Patent_Office, Retrieved June 6, 2018.
WIPO
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"Global Innovation Index 2017: Switzerland, Sweden, Netherlands, USA, UK Top Annual Ranking" Geneva, June 15, 2017, PR/2017/808
http://www.wipo.int/pressroom/en/articles/2017/article_0006.html.
WIPO
2018
Global Innovation Index 2017, Innovation Feeding the World, Author(s): Cornell University, INSEAD, WIPO, Publication year: 2017, http://www.wipo.int/publications/en/details.jsp?id=4193

EMPLOYEES' PERFORMANCE MANAGEMENT AS A QUALITY TARGET – A CASE STUDY IN A SOFTWARE COMPANY

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Abstract

Purpose *– The paper presents aspects related to performance management and evaluates the extent to which a Romanian software development company adopted them. The authors analyzed the employees' performance management process and performance and competence evaluation methods for an effective and efficient quality management system implementation.*

Methodology/approach *– The research methodology focused on one hand on a bibliographical study and an online case study and on the other hand on a qualitative research based on a semi-structured interview. During the research process, the quality manager of a software company was interviewed, the results being presented and analyzed in order to make recommendations.*

Findings *– Using continuous personal development, an approach focused on continuous feedback, and discussions focused on coaching and development are the new trends in employees performance management processes implementation.*

Research limitations/implications *– This paper presents information regarding employees' performance management in just one Romanian company and from just one area of activity. Future research can be performed on other companies, pertaining to other areas of activity in order to determine the level to which modern employees' performance management methods are successfully implemented.*

Practical implications *– The new employees' performance management instruments are surely supporting not only the raise of the employees' work performance but also their development and motivation, the continuous development of the communication process inside the company, the raise of the employees' loyalty towards the company, performance and quality improvement in general.*

Originality/value *– The results of this applicative research can be considered an example of "best practices" for other companies. This paper presents the employees' performance management as being a target for quality management and argues the idea that companies should take advantage of the employer's legal rights regarding employees' management performance by developing an internal process for employees' performance management that should lead to the quality of the implemented processes and to performance in general.*

Key words: *employees' performance, management, continuous personal development.*

Introduction

Having Jack Welch's idea "I never look at numbers, because numbers are not a vision but a product" as a start point, Money Express journalists created a collection of 25 interviews with top Romanian business people, in order to find out the "secrets behind the numbers'' and their business philosophy. One of the persons interviewed was Aliz Kosza, "one of the most mobile top managers from Romania''. Talking about motivating the employees and about how she manages to get the "the best out of everyone" she says that "it is really important to encourage individual performance, because it positively or negatively influences group performance'' (Dîrțu M., 2008). In order to practically make use of this suggestion, the manager needs to take into consideration at least two other aspects regarding: (1) the need to increase the employees trust in their own abilities and (2) the support of the employees in their continuous personal development and changes management.

Reflecting on self-esteem, Abrudan I. (2013) showed that "as a consequence to people's need for self reliance emerges an educational two-sided problem. A face is oriented towards the individual and it means that everyone can give his best to realize his ideals, and the other outlines a social objective defined by the fact that every community is interested to cultivate and to use all the cappabilities and potential available". Viewed through the organizational community perspective, this dual continuous active learning process supports the organizational and individual performance management and in the same time "requires a belief that we can be better than we are professionally, technically, socially, introspectively and more". (Wood M., 2017)

Referring to the lessons taught from applying the continuous personal development process, Wood M. (2017) outlines the fact that the process needs "continuous reflection and introspection", meaning increasing our ability to be the critics of our own actions, interactions and performances, in such a way that we could gain benefits both from our success and our failures.

Regarding the manager's role in raising the employees' performance by supporting them in the change management process and that of the continuous personal and professional development, a lot of authors consider that any manager and any leader should take into consideration the fact that "we cannot change anyone outside our person". Managers are responsible for "creating and enabling a proper environment to facilitate change and make the necessary changes within the individual and organizational level" (Lapoși E.O, Dan I.S and Oțel C.C., 2016).

From the legislative point of view, the Romanian employers need to introduce the employees' professional activity evaluation criteria in the individual work contract. Establishing the individual performance objectives and also their evaluation criteria is an employer's right and not an obligation according to article 40, line (1), paragraph f) of 53/2003 law, republished (Labor Code, updated 2018). According to the law, the rights regarding work relationships between employer and employee – including those related to the performance objectives and the evaluation criteria – are agreed upon through negotiation. (Badiu A., 2011)

As it was previously mentioned, the employees' performance management is, on one hand, an aspect that determines the employees' motivation and loyalty, and on the other hand, an employer's right. This paper argues that companies should take advantage of this right and develop an employees' performance management internal process that would lead to the quality of the implemented processes and to performance in general.

Background

It is already known that performance management helps companies be competitive and ensures their sustainability, consisting fundamentally in "measuring, reporting and managing progress in order to improve performance, both at an individual level, and at a corporate level" (Marr B., 2018a).

As it is shown by an article published by Ensight Management Consulting (2011) the strategic, operational performance at an individual or team level needs to be "a major objective for every company" and "any managerial decision needs to be based on a very good knowledge of the business' current state". In a study performed by Sherman Garr S. in 2008, more than 700 Human Resources (HR) leaders were asked the following question: "why they make performance management a priority?". The first two places in the ranking of the answers given by the respondents were occupied by "to create a high-performance culture" (54%) and on the second place, the same level (50%), "to evaluate employee and organizational performance" and "to equitably tie compensation and rewards to performance results". "To determine the employees' development needs" was ranked the 6th (27%), while "to comply with regulatory requirements" was ranked the 11th, the reason being mentioned by only 10% of the respondents. (Sherman Garr S., 2010)

Outlining the fact that "there are many, many performance management tools designed to make the process easier and more effective" Marr B. (2018a) presents a list of the most well-known tools out of which we mention two:

- 360 degree feedback – a tool that helps individuals to assess their performance based on the views of those around them, including their manager, supervisor, customers, suppliers, etc. The assessment results are privately analyzed and discussed with the employee. The

advantage of using this tool is that it "helps to democratize the review process, by weighing the opinions of many people, instead of just the individual's line manager".

- Personal development plans – a tool that helps employees to set out "how they want to grow, and what actions they can take to achieve that growth". It is based on reflection, introspection and awareness of the employee's performance and needs, setting future performance objectives and actions that will support personal and professional development. The advantage of using this tool is that it helps the employees feel more "invested in the company and the role they play in its success" and "identifies concrete steps that can help drive individual performance in the future".

A study presented by the same author outlines the importance of two other tools: ongoing feedback and coaching. The case study presents information related to the development of the performance management process and the "general principle of the new performance management system". A study performed inside the company showed that the performance management processes that consists in completing forms, holding meetings, and creating ratings consumed close to 2 million hours each year. As a result of this analysis, "instead of wasting time and money on ineffective and counterproductive performance management processes, Deloitte decided to scrap the annual evaluation cycle and replace it with ongoing feedback and coaching".

Research purpose and methodology

Having as a starting point the previously mentioned aspects, which were outlined by the bibliographical study, a qualitative research was performed, based on a semi-structured interview in a Romanian software development company. The case study was performed in the first semester of 2018, and the research methodology is presented in Figure 1.

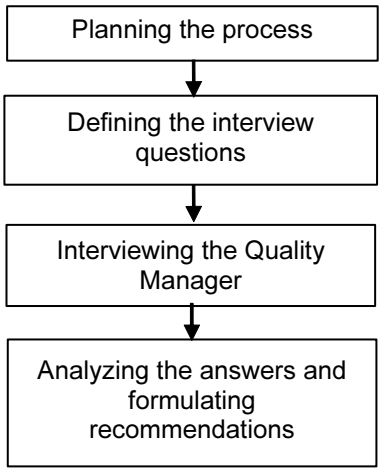

Figure 1: The methodology for the qualitative research

After planning the process (desired results, time, resources, methods etc.), six interview questions were defined:

1. Which are the determining elements of Performance Management inside the company?
2. Which are the benefits brought by Performance Management for the company?
3. Which are the parties involved in the employees' performance management process?
4. What does the employees' performance management process consist of?
5. How often does the employees' performance management process run inside the company?
6. What other aspects are there to be mentioned related to the employees' performance management process inside the company?

In the next steps, by going throw the interview questions, the company's quality manager was interviewed and in the end, conclusions were formulated and recommendations were offered.

Findings and results

What is further presented in this paper, are the main aspects related to employees' performance management in the software company, pointed out by the interviewed person.

Question 1 – Which are the determining elements of Performance Management inside the company?

Performance Management is first of all the result of the specific requirements of ISO 9001:2015 standard, through which the company has to identify and make available adequately prepared personnel that should ensure the efficient implementation of its processes' operation and control system. Having the 7.1.2 requirement, related to the Company's personnel, as a starting point, it was observed that these human resources should be periodically evaluated so that they reach the desired performance. Chapter 7.2 related to Competency is also very important for the Quality Management System especially because all employees should be competent at their work. The human resource's competency is evaluated periodically, which made it necessary to create an employees' performance continuous evaluation procedure.

The "Continuous Personal Development Guide" and the "Continuous Development Plan" internal procedure were developed inside the company, having the purpose of defining the principles and stages of the company's employees' evaluation process. Related to the Continuous Personal Development concept, the guide states from the beginning that it "is truly revealed only to those who are willing to work with themselves in order to achieve their purposes and reach to their full potential". The guide's motto is: "All that is valuable in human society depends upon the opportunity for development accorded the individual." (Albert Einstein)

Question 2 – Which are the benefits brought by Performance Management for the company?

One of the main objectives involves the evaluation of the employees and the establishment of the Continuous Professional Development Plan for all employees. The (1) Career Path and the (2) Continuous Development Plan are defined as a result. These focus on every employee's major career paths, stating the development stages every employee needs to go through in order to reach the previously set goals.

(1) Career Path – describes the main stages of professional development that an employee can go through inside the company.

(2) Continuous Development Plan – emphasizes mainly the continuous communication based on the following aspects, which have the continuous professional development as a common purpose: (1) setting mutual expectations, (2) setting and identifying objectives, (3) offering feedback and (4) facilitating communication and consolidating relationships.

The objectives of defining the Employees' Continuous Development Plan and its benefits are presented in Table 1.

Table 1. Continuous Personal Development – purpose and benefits

Performance Management by Continuous Personal Development	
Purpose	Benefits
Continuous encouragement and development Building healthy working relationships Mutual feedback Channel efforts in the right direction Develop a continuous communication flow Facilitate recognition of potential and progress Emphasize people's success Identify, eliminate barriers and improve overall performance	Continuous personal and professional development Fostering positive relationships Development and career planning Receiving constant feedback Goals are aligned with both organization and personal objectives Reward and recognition based on performance

Question 3 – Which are the parties involved in the employees' performance management process?

For every employee, the persons involved in the performance management process through Continuous Personal Development are:

- The direct superior inside the community
- The direct superior on the project the employee is involved in
- The HR department representative of the community

Question 4 – What does the employees' performance management process consist of?

The employees' performance management process consists of three stages:

1. Defining the employees' performance evaluation criteria – This stage analysis and defines the professional evaluation criteria for every employee as follows:
    - Technical knowledge – The employee's knowledge gathered up to the evaluation moment is evaluated, emphasizing the knowledge necessary for well performing his job. The following are taken into consideration: work results, the technical progress from the last yearly evaluation, the areas to be improved and the long and short time objectives.
    - Customer relationship – The employee's knowledge related to the work processes and customer communication and its ability to gain the customer's trust are evaluated. The following are taken into consideration: customer requirements, interactions during meetings (both written and verbal), flexibility and adaptability in fulfilling the customer's requirements.
    - Attitude – The employee's attitude towards the company, towards its team and its role and responsibilities is evaluated. The following are taken into consideration: responsibility, objectivity, openness, correctness, discipline and the ability to generate respect.
    - Work ethics (communication, independence, proactivity, coaching and mentoring) – What is being evaluated here is the employee's ability and desire to share his knowledge with his colleagues, to take initiative and to communicate efficiently (the employee is not aggressive, is an active listener, is assertive and offers constructive feedback).

2. Performance Evaluation – This stage is based on a continuous feedback, the performance management process being based on a personalized approach. Every employee receives feedback from his direct superior based on:
    - His technical abilities and knowledge and their progress,
    - Interaction with the customer and the customer's feedback,
    - Knowledge about the customer's line of work,
    - Work attitude and ethics.

3. Creating the Continuous Personal Development Plan

The continuous development plan is created by going through the following stages:

- Monthly feedback – every employee has a monthly meeting with his direct superior about the possible challenges and situation that might occur and offer each other feedback in order to improve and develop their knowledge and abilities. These meetings may be formal or informal and their purpose is to set professional goals and ways to reach those goals.
- Feedback form the HR's department – The HR responsible initiates conversations with employees in order to offer feedback and support whenever necessary. Employees can approach the HR department as their own initiative. These conversations may be both formal and informal.
- Feedback from the employee's direct superior on the project they are working on – employees may ask for their superior's feedback and support as their own initiative.

Question 5 – How often does the employees' performance management process run inside the company?

The evaluation process is personalized for every employee and its purpose is to overlap the employees' personal objectives and those of the company. The evaluation of every employee takes place:

- Between month 3 and 6 from the time of his employment, through a preliminary conversation – During this discussion, the employee also receives and offers feedback on the process of its integration in the team/project/company and has the opportunity to discuss the problems he faced during the accommodation period. During this meeting new goals are set for the following period of time.
- Annually, through an anniversary discussion – This meeting is coordinated by the direct superior inside the community and the HR responsible and its purpose is to come to some conclusions based on the activity of the previous year, on one hand, and to set future directions and objectives on the other hand. The meeting is meant to be an open one, and it consists of reiterating the employee's evolution throughout the last year.

Question 6 – What other aspects are there to be mentioned related to the employees' performance management process inside the company?

As it was already mentioned, every employee has a monthly meeting with his direct superior inside the community, the monthly feedback being centralized through an internal work instrument and analyzed during the anniversary meeting. The emphasis is placed on the employee's Individual Career Plan and on its personal development needs correlated to the ones of the company. During this meeting, subjects related to the new position inside the company (if a promotion was offered) are being discussed and conclusions are reached: strengths, areas that need improvement and future plans. The results of the periodic employees' performance evaluations are kept in a company's internal tool, in which one can follow the evolution of every employee at any moment throughout the year.

Discussion, recommendations and conclusions

Inside software development companies, the evaluation of the employees' performances is a strength even if they own or not a quality management system certification according to ISO 9001:2015 standard. The steps presented in this paper prove the fact that only through a correct evaluation of the employees' performances and their involvement in the company's processes may lead to success. Thus, a company's performances represent the sum of the employees' individual performances, and the individual performance depends on motivation, professional abilities and the way the employee perceives its work place. The identification of the individual needs and the connecting of these needs with the evaluation and stimulation categories, that may offer employees satisfaction, is one of the situations when management is identified as art.

After performing this case study in a software development company, the authors suggest that the employees be introduced in coaching programs inside the community as a result of their performances' periodic evaluation. Through these programs, the employees may identify the things, either consciously or subconsciously, that stop them from reaching their goals, and they can eliminate them in order to have access to the desired professional performance.

References

Abrudan, I.
2013
"On self-reliance." Review of Management and Economic Engineering: 12, 7-14.
ASRO
2015
SR EN ISO 9001:2015 Sisteme de management al calitatii. Cerinte
Badiu, A.
2011
"Evaluarea performanţelor angajaţilor."
http://www.3bexpertaudit.ro/Fisiere/Economistul%20expert%20nr%2043%20Evaluarea%20performan%20telor%20angajatilor.pdf.
Dîrţu, M. (editor)
2008
LIDERO Oameni de afaceri români de top dezvăluie secretele din spatele cifrelor. Bucharest, RO: Money Express Publishing.

Ensight Management Consulting
2011
“Utilizarea indicatorilor de măsurare a performanţei (KPI) în companiile din România.”
http://www.ensight.ro/wp-content/uploads/2011/02/ECONOMISTUL-expert.pdf.
Labor Code
2018
“Codul muncii actualizat 2018 - Legea 53/2003.” https://legeaz.net/legea-53-2003-codul-muncii/art-40.
Laposi, E.O., I.S. Dan, and C.C. Oțel
2016
“Change management – a dominant of the management of organizations.” Review of Management and Economic Engineering: 15, 306-313.
Marr, B.
2018a
“What are the key tools and techniques for performance management?”
https://www.bernardmarr.com/default.asp?contentID=772.
2018b
“Deloitte - Reinventing Broken Performance Management.”
https://www.bernardmarr.com/default.asp?contentID=1058.
Sherman Garr, S.
2010
“Development-Driven Performance Management. The Path from Once-a-Year Performance Management to Ongoing Employee Development.”
http://www.dresserassociates.com/pdf/whitepapers/Development-Driven-Performance-Management.pdf.
Wood, M.
2017
“Lessons Learned for Continuous Personal Development.”
https://www.projectmanagement.com/articles/387298/Lessons-Learned-for-Continuous-Personal-Development?regComplete=1&.

SUSTAINABLE INDUSTRIAL DEVELOPMENT

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Abstract

Purpose *– Sustainability stems from the idea that human activities are environmentally and resource-dependent. Health, social safety and economic stability of society are essential in defining the quality of life.*

Methodology/approach *- It is a sustainable society that shapes its economic and social system so that natural resources and life support systems are maintained.*

Findings *– At an industrial level, many factories use waste as fuel, recognizing the economic and environmental importance of waste recovery and reuse for rational use of natural resources.*

Research limitations/implications *– The need for prompt and radical changes in our attitude towards the environment and the issue of sustainable development, starting from existing technologies and strategies.*

Practical implications *– Tendency towards: a renewable energy based economy, the use of renewable materials, the permanent recycling of more difficult to find materials, better resource management, clean technologies aimed at reducing raw material and energy consumption, resulting in minimum quantities of waste that do not "affect" the quality of the environment.*

Originality/value *– The process of sustainable development can benefit from the use of techniques, functions and principles in terms of strategies for the general development of human society, in order to achieve in optimal conditions the objectives set with the achievement of the major objective: a clean and healthy planet.*

Key words: *sustainable development, environmental protection, biodiversity, natural resources, raw materials, waste, industrial technologies, sustainable production*

General aspects

"The sustained word has its origins in Latin, meaning" to stay "or" to support the bottom". A community needs to be supported from the bottom-up by present and future inhabitants. Some places, by combining specific physical, cultural and spiritual characteristics, inspire people to take care of their community. These are the places where sustainability has the highest chances of existence (maintenance) - Muscoe Martin, “A Sustainable Community Profile,” from Places, Winter 1995

Sustainability is based on the idea that human activities are environmentally and resource-dependent. Health, social safety and economic stability of society are essential in defining the quality of life.

The discussions on Sustainable Development began in the early 1970s. In 1972, the Environment Conference held in Stockholm for the first time it seriously raised the issue of environmental damage as a result of human activities, which endangers the future of mankind itself.

In 1983, the World Commission for Environment and Development (WCED) is created, led by Gro Bruntland, following a resolution adopted by the United Nations General Assembly.

In 1986, one year after the Cernobâl catastrophe, the so-called Brundtland Report of the World Commission on Environment and Development (WCED) entitled "Our Common Future" is published, which gives the definition of Sustainable Development, which is in fact the most cited definition

("sustainable development"): "sustainable development is the development that aims to meet the needs of the present without compromising the ability of future generations to meet their own needs."

The development without borders, registered when the world entered into the "industrial era" more than 200 years ago, has started from the image of the "unlimited" dimensions of our planet and its ability to ensure "endless" non-renewable mineral resources, unlimited living and well-being conditions for an ever-expanding population, and also the planet's ability to continually take over the pollutants resulting from industrial and non-industrial activity.

Given the fact that, starting from the need to make activities efficient, managerial approaches have taken over all fields of activity irrespective of their nature, the process of sustainable development can also enjoy the advantages of using the techniques, functions and generally the principles of this science regarding the strategies of general development of the human society, in order to achieve in optimal conditions the objectives set with the achievement of the major goal: the well-being of all with the preservation of biodiversity on a clean and healthy planet.

The spectacular growth in industrial and agricultural production, based on unprecedented advances in science and technology, which have led to a deepening of the world labor division, the expansion of international economic relations and exchanges, and the increasing interdependence on a global scale.

The imminent dissolution of important mineral resources such as oil, copper ores or precious metals, deforestation of huge forest areas, the disappearance of dozens and hundreds of animal and plant species every year, acid rains, dramatic thinning of the protective ozone layer and climate changes - are just a few of the elements that have made a number of scientific personalities increasingly alarmed about the precarious state of the natural environment and the need for prompt and radical change in our attitude towards the environment and towards the issue of sustainable development, building on the existing technologies and strategies.

The table below presents the 'Conservation of Natural Resources Concept', depending on: the raw materials used, the technologies used, the finished products and the possibility of re-using the respective products:

Table 1 - The concept of Conservation of Natural Resources

RAW MATERIALS	TECHNOLOGIES USED	FINISHED PRODUCTS	POSSIBILITY OF RE-USE
Reducing resource consumption	Low power consumption	Maximum duration of use	By recycling
Maximum use of recycled and reusable materials	With minimal amounts of emissions and leakage	Using minimum package sizes	Complex, integral use of raw materials
Use of waste as raw materials	Minimum quantities of waste	With minimal ecological destructive impact	Reuse
	Ensuring maximum environmental protection	With Maximum Benefits for the Environment	

As a consequence of the expansion of the industrialization process, the need for raw materials, energy and food has grown significantly, the urbanization process has expanded, reaching the maximum level of supportability of the planet due to the limited nature of mineral resources and due to pollution, which inherently accompanies the development of human society under the present conditions.

Promoting the sustainable structure in industrial production

“Sustainability refers to the capacity of a society, ecosystem, or any such existing system to function continuously in an undefined future without the exhaustion of key resources "- Robert Gilman, President of the Context Institute.

Restructuring the economy after 1990 aimed at giving up the large state socialist industry, which was consuming raw materials, fuels, energy and labor in excess, and switching to an economy that exploits complex and efficient natural resources based on efficient, intelligent and less polluting technologies.

Compared to the Communist Socialist Command, the private economy, lacking the necessary subsidies to resist competition on the globalized market, has come to be effective through the high quality of goods produced and low prices.

In order for private companies to resist in such markets, it was necessary to make every effort possible to reduce costs. This was possible, first of all, by reducing resource consumption and complex capitalization - in fact, the very goal of Sustainable Development. Thus we see that through performance, the requirements of this type of development are attained.

Increasing the living standards in Europe has led to increased requirements for environmental protection, quality of work, shared social responsibility and customer protection, as well as population’s health. Public institutions have an obligation to respond to society's concerns. This attitude was reflected in the decision of the Gothenburg European Council in 2001, which established Sustainable Development as a key objective of industrial policy.

The concept of sustainable development designates all the forms and methods of socio-economic development, the basis of which is primarily to ensure a balance between these socio-economic systems and the elements of natural capital.

Sustainable Development has three basic pillars: economic, social and environmental. These challenges require a change in industrial policy to increase the importance of social and environmental drivers.

The business environment plays an important role in meeting these needs. The social and ecological component is in the middle of the debate on shared social responsibility. Positive progress in industrial production trends in the EU as well as the reduction of polluting emissions also show that high competitiveness and environmental protection can be achieved by industry with the support of an adequate mix of policies.

The high demands on safety, health, social protection and customer protection, are to a large extent the consequence of the population's fear of the effects on the environment, public health and some moral implications of new technologies (such as genetically modified products, cloning). In addition, there is a fear that globalization would lead to the loss of cultural identity, increased competition with countries with low production costs, or the undermining of economic structures. As a result, these concerns reflect the need to review how businesses are leading, controlling and guiding.

The needs of society can also create new business opportunities. Thus, focusing on Environmental Protection has enabled European companies to be the leader in environmental technologies and encourages them to develop sustainable production based on lifecycle analysis. The proximity to consumer needs, especially food quality and safety requirements, has created new niches on the market.

Industrial policy must strike a balance, in order to achieve the ambitious goals of Lisbon and Gothenburg. Strong economic growth provides resources to meet the growing social and environmental needs, especially when the aging of the European population creates additional social requirements.

The need for the European industry to achieve a more structured production structure has become a driving force for growth and productivity, as mentioned in the Johannesburg World Summit on Sustainable Development report.

Companies with visions of the future, even SMEs, can achieve profits and "sustainable value", using design and innovation to create more environmentally friendly products, as well as outlets that are becoming more and more demanded by consumers.

The EU develops and strengthens long-lasting production policy to meet the Johannesburg Summit commitments on sustainable production and consumer standards. This policy has also been agreed with industry's representatives and major stakeholders to ensure their involvement.

The main elements for achieving this consolidation are: to encourage the widest possible spread of successful implementation practices, to improve the environmental efficiency of resource use and to increase the use of renewable resources; promoting the commercially viable recycling industry and implementing advanced practices; Implementing the concept of the "lifecycle" concept for Integrated Products Policy (IPP) through voluntary agreements, standards and declarations for organic products; encouraging the development and distribution of clean technologies by lifting the barriers to their implementation and encouraging public-private interaction in C & D; expanding the use of environmental management schemes, taking into account the specific characteristics of SMEs, and further promoting shared social responsibility.

Promoting a sustainable structure of industrial production also involves developing the capacity to promote, master and anticipate changes in the work process.

Boundaries in the process of sustainable development

"Therefore, I can say that the earth belongs to each generation during its lifetime, which is fully and completely due to it, and no generation can make bigger debts than the debts that can be paid during their existence" - Thomas Jefferson, September 6, 1789.

With all our desire to change the current state of affairs, we must understand that on this path of sustainable development there are also limits imposed mainly by:

- the technological level at which we find ourselves (when not all that is desirable can still be achieved) pollution accompanying the industrial activity;

- the strict calculation of economic efficiency, of existing and sustainable technologies (so far more expensive than classical ones), as well as;

- the fact that there are still people who do not have the minimum decent living conditions and who must be helped in order to achieve that decent minimum, which will mean additional resource consumption, possible new natural imbalances, pollution, etc.

There are no "clean" technologies, but only less polluting, which, no matter how large our desire is, will continue to cause pollution in all its forms and thus further damage to environmental factors.

It is not possible to completely give up chemical fertilizers and pesticides, given the growing demand for food for the population of the planet, which is growing each year.

The trend must be towards an economy based on renewable energy sources, the use of widely available and preferably renewable raw materials, the permanent recycling of the materials that are more difficult to find, better management of food resources, clean technologies aimed at reducing consumption of raw materials and energy, resulting in minimal amounts of waste that will not "affect" the quality of the environment.

The figure below includes the 'Environmental transformation of raw materials in industrial technologies':

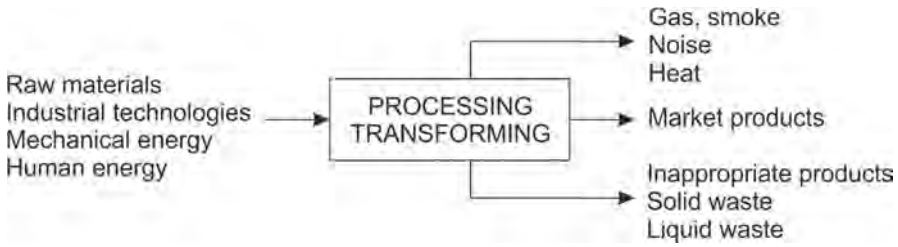

Figure 1 - Ecological transformations of raw materials in industrial technologies

It is not possible to abandon fast and safe shipments on land, water and air, which require fuel and generating pollution. Passenger transport, in the conditions of travel freedoms, freight transport in the conditions of economic globalization, etc. can no longer be reduced to sailing or animal-haul transport, which characterized the 17th-18th centuries.

The different economic interests of the states will continue to have more permissive pollution rules, for example in the case of Israel in terms of the chemical industry, India in the field of running water pollution, the United States in the case of CO_2 emissions in violation of the provisions of the Kyoto Protocol etc.

The limitations in the sustainable development process also come from the unhonored international support from developed countries to developing countries, in areas such as ensuring the supply of drinking water to the population, developing agricultural production, ensuring minimum electricity, etc. Perhaps the most serious issue is the systematic transfer of poorly productive and polluting industries and technologies to poor countries from the developed countries under the conditions of excessive, immoral prices.

Conclusions

"Sustainability is an emergency doctrine whereby economic development and progress must be made and maintained over time, within the boundaries of ecology in the broadest sense - through the interdependence of human beings and their jobs, the biosphere and laws of physics, and the chemistry that governs it. The result is that environmental protection and economic development are really antagonistic processes" - William D. Ruckelshaus, Toward

"A sustainable society is the one that shapes its economic and social system so that natural resources and support systems of life are maintained"

Each one of us, consciously or not, can contribute to sustainable development. We can say that we have a sustainable thinking when throwing plastic or paper waste in specially designed places.

At an industrial level, many factories use waste as fuel, and have also implemented household-based heating systems based on waste incineration. The factories / firms are the first to realize the economic (but also ecological) importance of waste recovery and reuse.

However, the radioactive waste we have stored at the bottom of the oceans and in the earth's crust will be problems that would need to be resolved by future generations, meaning they will have to pay money and will have work done in our account, who we pollute now.

As a consequence of the expansion of the industrialization process, the need for raw materials, energy and food has grown significantly, the urbanization process has expanded, reaching the maximum level of supportability of the planet due to the limited nature of mineral resources and pollution, which inherently accompanies the development under the present conditions of human society.

References

Angelescu, A. and Ponoran, I.
1995
Protecția mediului ambiant, Editura ASE, București
Arsân, O.C. and Jucan, D.,
2013
Corporate social responsability and tax management, Review of Management and Economic Engineering, Vol. 12, Nr. 4 (50), Todesco Publishing House, Cluj-Napoca, ISSN 1583-624X.
Bacali, L. and Luca, G.
2003
Managementul marketingului ecologic, Editura "Gheorghe Asachi", Iași
Bacali, L., coord.
2010
Antreprenoriat – Manualul calificarii, Editura UTPRESS*,* Cluj-Napoca,
Collin, P.H.
2001
Dicționar de ecologie și mediu înconjurător, Editura Universal Dalsi, București
Commission européenne
2002
Stratégie de l'Union européenne en faveur du développement durable
Crocker, D.
2002
Criteria for Sustainable Development, University of Arizona Press, Tucson,
Muresan, C.M. and Bacali, L.
2016
"Aspects regarding the use of marketing research as a support for the investment decisions", Conferinta - Proceedings of the 5th Review of Management and Economic Engineering International Management Conference, titlul volumului - From Management of Crisis to Management in a Time of Crisis, Editura Todesco Publishing House, pag. 161 – 169, Romania Cluj-Napoca, ISSN 2247-8639.
Muscoe, M.
1995
A Sustainable Community Profile, from Places, Winter 1995.
Pelkmans, J.
2003
Integrarea Europeană. Metode și Analiză Economică,
Rojanschi, V. and Bran, Fl.
2002
Protecția și ingineria mediului, Editura Economică, București
Rojanschi, V., Bran, Fl. and Diaconu, Gh.
2002
Politici și strategii de mediu, Editura Economică, București,
Stockholm Declaration
1972
Stockholm *Declaration of the United Nations Conference on the Human Environment,* U.N. Doc.A/CONF 48/14 (1972).
The Bruntland Report
1987
Our Common Future: The World Commission on Environment and Development, G. Bruntland, editor, Oxford Press
UN General Assembly
2000
United Nations Millenium Declaration, U.N. Doc.A/Res/55/2.
UNEP, Governing Council
2002
International Environmental Governance, Decision SS.VII/1, Febr.
Vasile, V. and Zaman, Gh. (coord.)
2005
Dezvoltarea durabilă, Editura Expert, București
World Summit on Sustainable Development,
2002
Plan of Implementation

THE EFFECT OF FINANCIAL LEVERAGE ON DIVIDEND POLICY: EVIDENCE FROM AN EMERGING MARKET

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Abstract

Purpose *– The purpose of the study presented in this paper is to provide empirical evidence on the association between dividend policy and capital structure of Romanian non-financial companies.*

Methodology/approach *- The present research is based on literature review as well as on data obtained from firms listed on the Bucharest Stock Exchange for a period of thirteen years from 2005 to 2017.*

Findings *– The findings show that financial leverage has a significant negative impact on dividend payout. The negative association implies less dividend payments done by high debt companies. The results also indicate that changes in earnings and the previous year's dividend yield have a significant impact on dividend policy in case of Romanian non-financial firms. Thus, managers can enhance the firm's profitability by handling correctly the cash conversion cycle and by keeping its components at an optimal level.*

Research limitations/implications *– This study was performed without considering the industries particularities which might have an impact on the companies' financial strategy. Nonetheless, the research provides important insights for managers in terms of dividend policy and at the same time is expected to contribute to the enhancement of the literature in the field.*

Practical implications *– The findings of this investigation imply that less debts financing by the companies lead to increasing the amount that could be paid to shareholders. Such findings can be used to guide managers in undertaking competitive dividend policies to improve business performance and to attract investors.*

Originality/value *– This paper investigates the link between dividend policy and corporate leverage of the firms from Romanian equity capital market. Corporate managers can enhance value for their shareholders by proper management of dividend policy.*

Key words: *dividend policy, leverage, dividend yield.*

Introduction

The dividend policy remains one of the most important topics in corporate finance. Dividend policy is a set of guidelines a firm uses in order to decide how much of its earnings it will distribute to its shareholders. A rapid growing literature has investigated the dividend policies of companies from developed countries, while little research has yet been published exploring the dividend policies of firms from emerging countries (Kaźmierska-Jóźwiak, 2015).

The dividend policy is an essential corporate parameter, influencing not only the company but the managers, debt holders and shareholders as well (Eriotis et al., 2013). Eriotis (2005) states that dividend policy is significant because it affects its capital structure, since the retained earnings aim to fund the company and the firm's dividend decision may alter the value of its stock.

In order to cope with the growth occasions arisen from the external environment, almost every company takes into account various options and strategies such as balance between dividend payment, corporate leverage, issuance of new stocks and financial efficiency (Gill, Biger, and Mand, 2013); (Asad, and Yousaf, 2014). This is one of the most important challenges that financial managers are dealing with (Asif, Rasool, Kamal, 2011). Financial leverage shows how much debt the corporation employs in its capital structure (Ikechukwu et al., 2016). Financial leverage is a two-edged sword—generating advantageous results when things go well and the reverse under adverse conditions (Ikechukwu et al., 2016).

In United Kingdom, Al Shabibi and Ramesh (2011) investigated the determinants of dividends using a sample of 102 non-financial companies. They found no significant relationship between the leverage and the companies dividend payouts. Ikechukwu et al. (2016), on the other hand, found that financial leverage has statistically significant effect on dividend policy of quoted conglomerates in Nigeria. Al-Kuwari (2009) studied the determinants of dividend policies for firms listed on Gulf Co-operation Council country stock exchanges and found a strong negative correlation between leverage and the dividend payout ratio. Vo and Nguyen (2014) examined the interrelationship among leverage and dividend policies on a sample of 81 listed firms on HCM City Stock Exchange during the period 2007–2012. The results indicated a negative relationship between leverage and dividend. Asif, Rasool, and Kamal (2011) investigated the relationship between dividend policy and financial leverage of companies listed with Karachi Stock Exchange during the period 2002 to 2008 and found that financial leverage had a negative impact on dividend payout. Ghasemi, Razak and Muhamad (2018) applied a simultaneous equations model on a sample of firms listed on the Main board of Bursa Malaysia during 2006–2014 and found that leverage had a negative impact on dividends. Vasiliou and Eriotis (2003) investigated the association of the dividend policy with the debt ratio for the firms listed on the Athens Stock Exchange during 1996 and 2001. Their regression results suggest that there is a positive association between dividend policy and leverage.

In this paper, we examine the relationship between dividend policy and financial leverage of non-financial companies listed on the Bucharest Stock Exchange Market for a period of thirteen years from 2005 to 2017. For this purpose, panel data analysis is applied to explore the impact of debt ratio on the dividend per share of the Romanian companies mentioned above. This research is valuable for both theory and practice by providing empirical evidence from an emerging market, namely Romania. No study, to the best of our knowledge, has examined the relationship between dividend policy and financial leverage on the Romanian market.

The rest of the paper is organized as follows: in the next paragraph the methodology is detailed, moreover, the empirical results are presented in the third section and, finally, the last section presents the conclusions.

Methodology

The goal of this paper is to investigate the relationship between dividend policy and financial leverage using multiple least square regressions. The financial data were gathered from the annual reports and financial statements of 171 Romanian non-financial companies listed on Romanian equity capital market over the period 2005-2017.

This study uses panel data analysis. The dependent variable, representing the company's dividend policy, is the dividend per share. The dependent variable is regressed against the independent variables, namely, debt ratio, dividend yield and change in earnings, based on the following equation (Asif, Rasool and Kamal, 2011):

$$DPS_{it} = \alpha_0 + \alpha_1 \cdot DR_{it} + \alpha_2 \cdot DY_{it-1} + \alpha_3 \cdot \Delta E_{it} + \varepsilon_{it} \quad (1)$$

where:

DPS_{it} – dividend per share of the company *i* at time *t*;

DR_{it} – debt ratio of the company *i* at time *t*;

$DY_{i,t-1}$ – dividend yield of the company *i* at time *t-1*;

ΔE_{it} – change in earnings

ε_{it} – error term.

The debt ratio is used to measure a company's financial leverage and represents the proportion of a corporation's assets that are financed by debt. The *DR* is defined as follows:

$$DR = \frac{TD}{TA} \tag{2}$$

where:

TD – total debt;

TA – total assets.

Dividend yield shows the amount of cash dividends distributed to the firm's common stock holders relative to share price. The *DY* is calculated as follows:

$$DY = \frac{DPS}{PS} \tag{3}$$

where:

PS – price per share.

Change in earnings is determined as the ratio of the change in operating earnings at the end of the year to the level of operating earnings at the beginning of the year. The *ΔE* is determined as follows:

$$\Delta E_{it} = \frac{OE_{it} - OE_{i,t-1}}{OE_{i,t-1}} \tag{4}$$

where:

OE_{it} – operating earnings of the company *i* at time *t*;

$OE_{i,t-1}$ – operating earnings of the company *i* at time *t-1*.

Results

Table 1 presents a broad description of the summary statistics of the variables used in this study. It reveals the statistical means and standard deviation.

On average, about 23 percent of the Romanian company's assets are financed with debt representing a higher percentage than that of Iranian (20 percent) companies (Emamalizadeh, Ahmadi and Pouyamanesh, 2013), but is lower than the average corporate indebtedness for the Pakistani (73 percent) companies (Asif, Rasool and Kamal, 2011).

The average value of dividends distributed to the Romanian company's shareholders relative to share price is lower that of Pakistani (0.09) companies (Asif, Rasool and Kamal, 2011).

Table 1. Descriptive statistics of variables

	Mean	Std. Deviation
DPS	1.56	5.12
DR	0.23	0.22
DY	0.06	0.09
ΔE	0.58	3.72

Table 2 presents the results of estimating regression model by examining the relationship between dividend policy and financial leverage of non-financial companies listed on Romanian equity capital market. In order to estimate the effect of independent variables on the dividend per share, cross section weights and White's heteroskedasticity have been taken into account.

Table 2. Results of regression

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.369	0.041	32.682	0.000
DR	-1.345	0.184	-7.301	0.000
DY	-1.656	0.626	-2.643	0.008
ΔE	-0.028	0.005	-4.986	0.000
R^2	0.220			
Adj. R^2	0.216			

The results of this regression show that dividend per share and debt ratio have significant negative association. Thus, the lower the leverage the corporate employs, the higher the dividend per share that it distributes. This finding is in line with (Al-Kuwari, 2009); (Asif, Rasool and Kamal, 2011); (Vo and Nguyen, 2014); (Ghasemi, Razak and Muhamad, 2018) but does not agree with the findings of (Vasiliou and Eriotis, 2003); (Emamalizadeh, Ahmadi and Pouyamanesh, 2013) where they mentioned the fact that debt ratio is positively associated with dividend policy.

The analysis documents a negative relationship between last year dividend yield and dividend policy, which means that an increase in the dividend yield has an indirect impact on the next year's dividend. This findings is not consistent with (Vasiliou and Eriotis, 2003); (Asif, Rasool and Kamal, 2011); Emamalizadeh, Ahmadi and Pouyamanesh, 2013). It can be noticed a significant negative association between change in earning and dividend policy. This is not in line with (Vasiliou and Eriotis, 2003); (Asif, Rasool and Kamal, 2011).

Conclusions

This paper investigates the relationship between dividend policy and financial leverage using a sample of non-financial Romanian companies. The study is considered a model that links the corporate dividend policy with the debt ratio of the company, the dividend yield and the change in earnings of the firm. The results indicate that leverage has a significant and negative impact on the dividend policy of Romanian firms. This means that companies with lower leverage have a generous dividend policy. The relationship could be justified by the pecking order theory which states that internal financing is less costly compared to external financing. By conducting this study, we have contributed with knowledge regarding the factors that affect the dividend policy of companies on Romanian market which are useful for academics, analysts and investors.

References

Al-Kuwari, D.
2009
Determinants of the Dividend Policy in Emerging Stock Exchanges: The Case of GCC Countries, Global Economy & Finance Journal, 2(2): 38-63.
Al Shabibi, B. K. and Ramesh, G.
2011
An Empirical Study on the Determinants of dividend policy in the UK, International Research Journal of Finance and Economics, 80: 105-120.
Asad, M. and Yousaf, S.
2014
Impact of Leverage on Dividend Payment Behavior of Pakistani Manufacturing Firms, International Journal of Innovation and Applied Studies, 6(2): 216-221.
Asif, A., Rasool, W. and Kamal, Y.
2011
Impact of financial leverage on dividend policy: empirical evidence from Karachi Stock Exchange-listed companies, African Journal of Business Management, 5(4): 1312–1324.
Emamalizadeh, M., Ahmadi, M. and Pouyamanesh, J.
2013
Impact of financial leverage on dividend policy at Tehran Stock Exchange: A case study of food industry, African Journal of Business Management, 7(34):3287-3296.
Eriotis, N.
2005
The Effect Of Distributed Earnings And Size Of The Firm To Its Dividend Policy: Some Greek Data, International Business & Economics Journal, 4(1): 67-74.

Eriotis, N. et al.
2013,
The Factors that Affect the Dividend Policy of the Greek Listed Firms Prior to the Economic Crisis: A Comparison to Nyse, Nasdaq, Norwegian and U.K. Firms, American Journal of Economics and Business Administration 5(4): 139-152.
Ghasemi, M., Razak, N. AB and Muhamad, J.
2018
Dividends, Leverage and Endogeneity: A Simultaneous Equations Study on Malaysia, Australasian Accounting, Business and Finance Journal, 12(1): 47-64.
Gill, A., Biger, N. and Mand, H. S.
2013
Corporate leverage, financial efficiency, and the decision of Indian firms about the amount of dividends', International Journal of Business and Globalisation, 11(3): 258–274.
Ikechukwu, O. E. et al.
2016
Effect of Financial Leverage on Dividend Policy of Quoted Conglomerates (2010-2015), in Managing Diversification for Sustainable Development in Sub-Saharan Africa: Proceedings of 2016 International Conference of the Faculty of Management Sciences, Awka: 123-135.
Kaźmierska-Jóźwiak, B.
2015
Determinants of Dividend Policy: Evidence from Polish Listed Companies, Procedia Economics and Finance, 23: 473 – 477.
Vasiliou, D. and Eriotis, E.
2003
The Determinants of Dividend Policy: Some Greek Data, European Applied Business Research Conference, Venice, Italy: 1-5.
Vo D. H. and Nguyen, V. T.-Y.
2014,
Managerial Ownership, Leverage and Dividend Policies: Empirical Evidence from Vietnam's Listed Firms, International Journal of Economics and Finance, 6(5): 274-284.

ANALYSIS OF THE PARTICULARITIES OF THE LOGISTICS MARKET FROM SOUTH – EAST EUROPE

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Abstract

Purpose *– The research is based more on the characteristic elements of the socio-cultural environment and the politico-legal component and tries to identify the particularities of the logistics market from South-Eastern Europe (Bulgaria, Macedonia, Romania, Georgia and Turkey). The main hypothesis is that each country has important particular aspects that need to be taken into consideration in a business, more so, in case of a business from the logistics field.*

Methodology/approach *– In order to carry out this research it has been chosen the method of the questionnaire. Both open and closed questions have been used, with the aim of emphasizing the established objectives. We pursued the fulfillment of following objectives: identification of the social-economical particularities of the business environment; Aspects regarding the local infrastructure (roads, borders, warehouses).*

Findings *– There are some common elements among the analyzed countries in view of the elements that help to create a high level of logistics serving. The speed of honoring an order is the most important element brought by the managers from he analyzed countries. Consistency in honoring the order is considered to be another important element. The most important element that influences the activity of a business and, which acts from the general external environment, is the economic component.*

Research limitations/implications *– There have been questioned only the top managers from the branches of one company from the following countries: Bulgaria, Georgia, Turkey, Macedonia, Romania, aiming to identify the particularities of the logistics market from each country.*

Practical implications *– The present research effort is interesting and useful both for the theoretical approach but more so, in practice. The presented material could represent an interesting working instrument for the managers of logistics companies. The conclusions have been presented, and have already been put to the disposal of Gebrüder Weiss, being now used in the managerial process for identifying the performing competencies and for formulating sustainable strategies for future development which can assure the competitive advantage.*

Originality/value *– It is one of the few approaches that attempt to analyze the performance of a company that provides integrated logistics services from a cultural perspective, taking into account some significant elements of the general and specific external environment and their influences on a business of its kind.*

Key words: *logistics, management, culture.*

Introduction

In the last decades management of logistic activities has approached a new working perspective. Logistics is an integrated part in all business strategies. In the same time, a number of factors have led to the growth in the complexity of logistic management. Hence, a lot of companies have outsourced logistic activities to third party logistic suppliers (3PL). Today, 3PL plays a critical role in the supply chain of the customers. These are more and more seen as a grouping of strategic partners

that can play an essential role in optimizing the supply chain, and therefore providing a sustainable competitive advantage.

Another factor with great influence on adopting the 3PL services is globalization. Due to the fact that companies enlarge the market outside the national boundaries, more sophisticated logistic services are required: multimodal transport and evolution according to international standards. Logistic services of 3PL type have developed this type of competencies and can effectively transport goods in different countries by using the multimodal transport and also respecting the legislation of international commerce.

Many of the logistics activities have been outsourced in order to reduce costs and the relationship with specialized companies has become more and more special. These business organizations that initially aimed only transport activities, trucking, have embraced many serving elements, so that they can increase the level of serving. Thereby, there have been put to disposal: special warehouses, intermodal terminals, terminals for cross-docking, transport management information, optimizing the transport routes and premium services of express type. All these have led to the development of a long term partnership, with strong influence on the main indicators for economic performance. Thus, the terms 3PL and 4PL appeared, aiming a partnership of strategic nature and consolidating the supply chain by increasing certain strong groups that together obtain important competitive advantage. „The *2016 20th Annual Third Party Logistics Study* shows continued collaborative and positive relationships between shippers and third-party logistics providers, which have been developing since the study began 20 years ago. This survey suggests 3PLs and their customers are becoming more proficient at what they do, individually as well as together, which is improving the quality of their relationships. Both parties – 93% of 3PL users and 94% of 3PL providers – reported that their relationships are successful and that their work is yielding positive results (2016 Third-Party Logistics Study)."

„The *2016 3PL Study* showed that 70% of those who use logistics services (shippers) and 85% of 3PL providers said the use of 3PL services has contributed to overall logistics cost reductions, and 83% of shippers and 94% of 3PL providers said the use of 3PLs has contributed to improved customer service. Moreover, the majority of both groups – 75% of shippers and 88% of 3PL providers – said 3PLs offer new and innovative ways to improve logistics effectiveness (2016 Third-Party Logistics Study)".

Third-party logistics providers can add value to customers that go far beyond cutting costs, which is shifting the conversation from moving loads at the lowest possible cost to maximizing value realized from the overall network. That means today's supply chain is no longer just about moving products from Point A to Point B, but also about creating dynamic and responsive supply chains that can create a competitive advantage for shippers. Also, it is widely recognized that 3PLs can help shippers meet fulfillment requirements while ensuring shipments are accurate and on time. 3PLs are also helping shippers speed their products to market and flex up or down based on demand (2018 Third-Party Logistics Study).

The presented research takes into consideration, *the identification of the particularities of logistics markets from South-Eastern Europe,* starting from the idea that each country has important and particular aspects which must be considered, including here elements regarding infrastructure, politico-legal frame, and weather problems and also aspects of psycho-social nature. Therefore, it is important to adapt the business to these aspects and it's interesting to establish the different sides in approach related to the level of logistics serving.

In order to carry out this research the method of the questionnaire has been chosen. Both open and closed questions have been used, with the aim of emphasizing the established objectives.

We pursued the fulfillment of following objectives:

- Identification of the social-economical particularities of the business environment
- Aspects regarding the local infrastructure (roads, borders, warehouses)

There have been questioned a number of 3 top managers from the each branches of Gebruder Weiss from the following countries: Bulgaria, Georgia, Turkey, Macedonia, Romania, aiming to identify the particularities of the logistics market from each country.

The questionnaire was designed together with the representatives of Gebruder Weiss from Romania that also validated it and intermediated the administration process and collection of data. The obtained data was transmitted for analyzing the results.

Important elements from the perspective of collaboration with business partners regarding serving clients

From the effected analysis we can notice that on the Bulgarian elements we have a relatively balanced distribution of the 4 analyzed components (price, flexibility, consistency and speed) which are components of serving clients. For Georgia, it appears that only two components are important, speed and price. It is not of great importance to respect a promise and to be flexible when honoring orders. Macedonia is in the same situation outlining all 4 components. Turkey seems to be sensible only about the operation speed and not so much in the other areas. For Romania the most important aspect is to keep the promise. It might seem strange but this aspect is evident from the effected analysis.

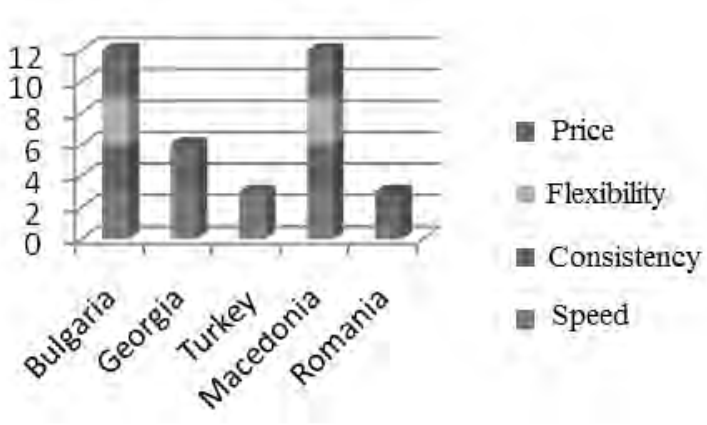

Fig. 1. Important elements from perspective of the collaboration with business

Elements of the business environment that influences the establishment of an operation strategy in the served area

The graph shows that for 4 of the 5 analyzed countries, Bulgaria, Turkey, Macedonia and Romania, the most important element that these countries consider to be of outmost influence and which acts in the general external environment is the economic component, that is, the elements regarding inflation, exchange rate, etc. All these elements have the greatest influence on the company and it seems that during the decision-making process this economic component is taken greatly into consideration.

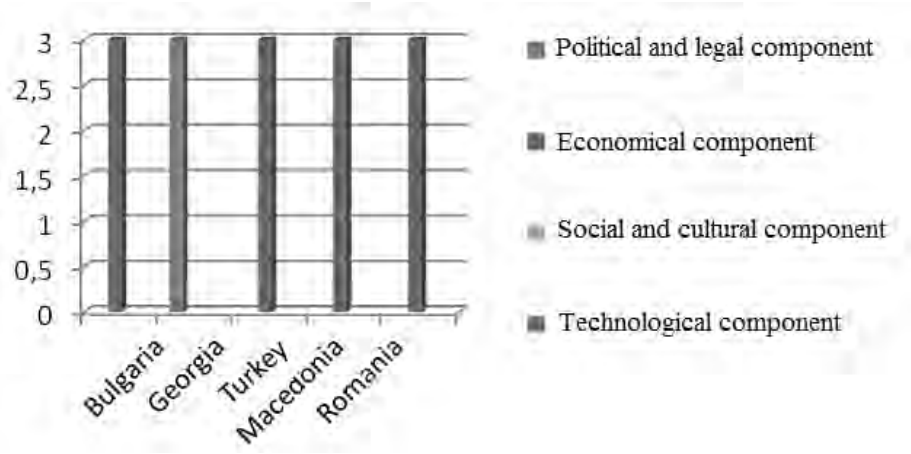

Fig. 2. Elements that influence the establishment of a new strategy

In Georgia there is another element of the environment that matters more, and that is, the political-legal component. This country is probably more instable from a political point of view and therefore exactly this political component is of most importance.

Aspects that have a greater influence on the performance of the activities

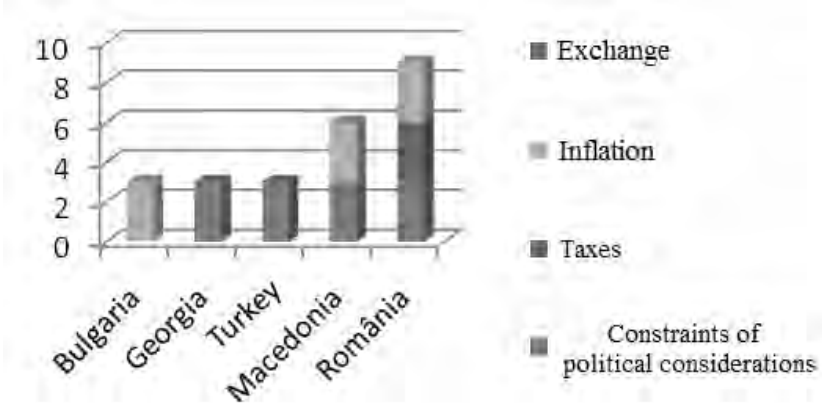

Fig. 3. Elements that influence the performance of the activity

In this particular question, for the sake of the analysis, we detailed certain elements from the economic component. After analyzing the graph we notice that one very important element for at least three countries from the South Eastern part of Europe (Bulgaria, Macedonia and Romania) is the inflation which has a decisive impact on the performed activity of the company. Bulgaria considers that only inflation can be a danger in performing the activity. Macedonia considers this to be at half and Romania at approximately one-third. Another extremely important component is represented by the constraints of political considerations that appear in four of the five analyzed countries, that is, Georgia, Turkey, Macedonia and Romania. This component has a big influence for these countries on approximately equal quota. The only country with opinions also regarding the taxes, an aspect that is also related to the economic component, is Romania. One-third of the respondents considered that this element is decisive in performing the activity on the logistics market.

Considerations on competition on the internal logistics market from the coordinated area and the offered services

Competition on the internal market is mainly considered to be between small and big. None of the referred countries consider it to be at medium level. There are three countries, Bulgaria, Turkey and Romania that sees a big competition on the logistics market, these being probably the most developed countries from the five analyzed. If we analyze the Romanian market, we can notice that there are a lot of companies on the logistics market spread on companies that offer full logistics services and companies that only deal with transport, the latter having a relatively high quota. For Turkey it is important to transport its goods towards Western Europe. This aspect can also be noticed by the large number of cars with Turkish registration number that pass through Romania. Also, Bulgaria is a country with intense economic activity which trades with the Western market. Hence, this can be an explanation for the big competition in these countries. The other two countries, Georgia and Macedonia consider that they deal with a low competition rate.

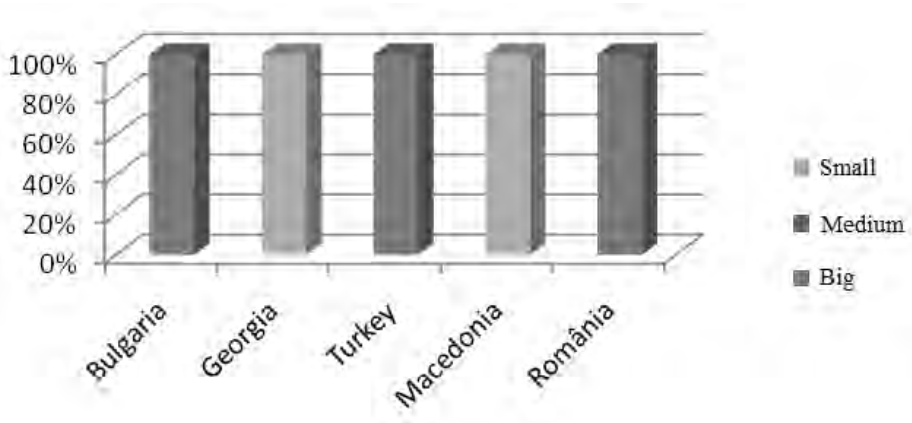

Fig. 4. Competition on the logistics market

Number (according to importance) the main players from the logistics market in your area.

Bulgaria: Schenker, DHL, DSV, M&M

Georgia: Doplomat Georgia (Distribution Logistics)

Turkey: EKOL, MARS, BARSAN

Macedonia: DB Schenker, K&N, DHL

Romania: DB Schenker, DSV, KRN, K&N

There are a few big players on the South Eastern market. DB Schenker – which appears to be on the first place in, at least, three of the 5 countries (Bulgaria, Macedonia, and Romania). Other competitors are K&N and DHL. The latter has a somehow different profile of activity because they are orientated towards services for quick serving of the clients, so on elements that have specific particularities on the market.

Which of the services offered by Gebruder Weiss are more accessed on the market you coordinate?

According to the answers, we have a relatively balanced division. Mainly, if we analyze Romania, almost all services are covered equally (road, rail, sea, air transport, storing), and less the counseling service. Macedonia does not offer services for rail transport and counseling. Turkey also covers 3 services, except the counseling service. Georgia doesn't offer counseling as well and Bulgaria does not offer rail transport.

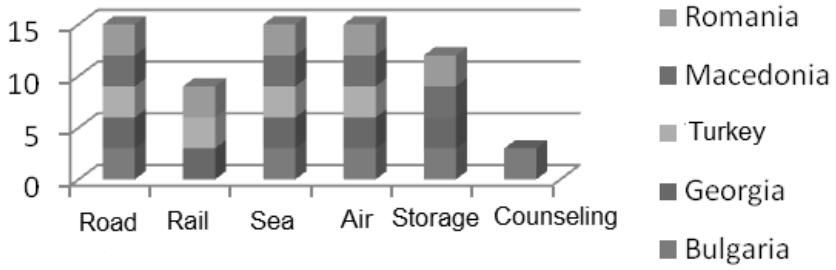

Fig. 5. Accessed services on the logistics market

Considerations regarding the infrastructure on the logistics market from the coordinated area and other specific aspects

How do you consider the road network in your country?

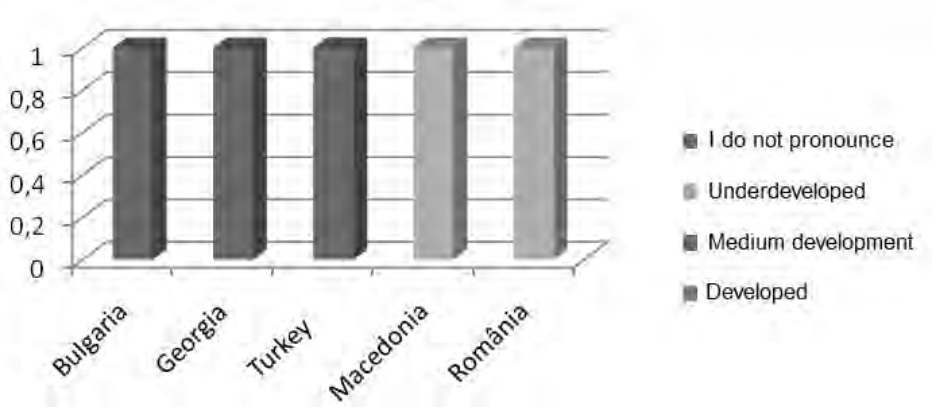

Fig. 6. Road network in each country

Bulgaria, Georgia and Turkey consider that the road network has a medium development although it is known that these countries don't have a good position in the highway area. More honest answers had Macedonia and Romania which considered that the road network is poorly developed. We asked this question because this aspect influences greatly the logistics part. Mainly, if the road network is poorly developed then the cruising speed is lower and the operation costs increase, which means that the time for honoring an order also increases together with consumption, the time is higher so the wage of the drivers is higher. As a whole, everything leads to very high costs and this in turns is reflected in the costs offered on the market and is hence not well perceived by clients. Therefore, there are many dangers that can cause that goods don't reach their destination under secure conditions. For example, Dacia mentioned that due to a poorly developed road network, they request an additional 30 Euros per car for the cars which are transported to Western Europe.

Are there highways on the main used segment of road transport?

As we know and as it can be noticed in the graph, Romania has the worst situation in this department. In the other countries, the highway network is somehow better developed compared to Romania. It seems that the respondents are satisfied with this aspect.

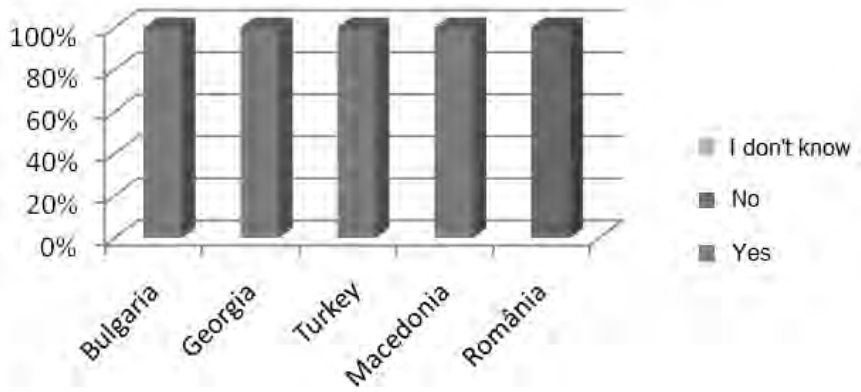

Fig. 7. Existence or lack of highways

Elements regarding the turbulences of weather conditions (natural factors) have a great influence on you? Which one?

Bulgaria: no

Georgia: minor impact

Turkey: no

Macedonia: no

Romania: winter - snow, summer - broken bridges

When we asked this question, we mainly considered the high snow, flood and so on. The Bulgarians answered negative to this question although in the last years they have had big problems due to snow. There was a big period of time with road blockage. Georgia considers that these natural factors have a small impact on their activity. Turkey and Macedonia have also responded negatively. Romanians consider that mainly in winter they have problems due to blockage caused by snowfall and in summer due to flood. In certain areas there are broken bridges that affect the traffic.

How do you see the taxing system on infrastructure?

The taxing system for infrastructure is considered to be on a medium level in Georgia and Romania and relatively small in Turkey and Macedonia, which means that we have problems regarding the taxing system. A high amount of money is requested for services that are not so good.

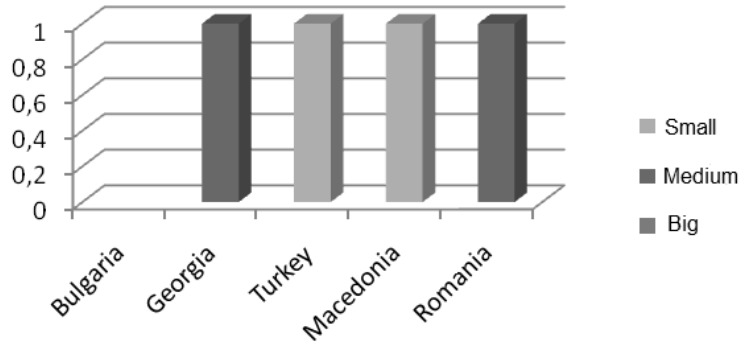

Fig. 8. Taxing system for infrastructure

Is the country you operate in an EU member state?

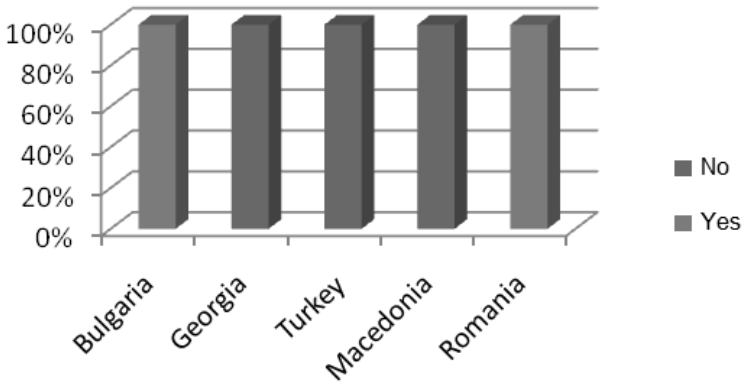

Fig. 9. EU member states

From the five referenced countries, two are EU members, Bulgaria and Romania and 3 are not, Georgia, Turkey and Macedonia. We asked this question in order to correlate it with another question (fig. 10), that is, if customs formalities would be more complicated for the countries that are not EU members because in the European Union, everything that is considered intra-Community transport

does not encounter problems with customs taxes and the paperwork that accompanies the transport are simpler.

Are the customs formalities complicated?

The aspect mentioned in the previous question is reflected in the graph from fig. 10. We can notice that Turkey and Macedonia, due to the fact that they are not EU members, encounter complicated customs formalities.

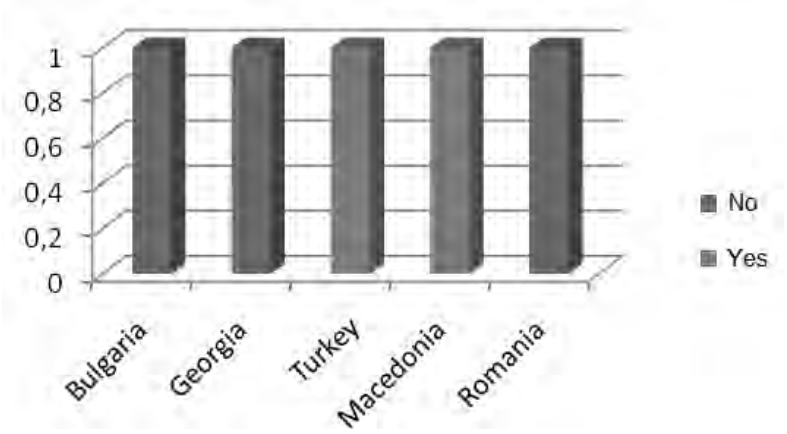

Fig. 10. Customs formalities

How many logistics terminals do you have?

Bulgaria: 1

Georgia: 1

Turkey: -

Macedonia: 1 (rented)

Romania: 6

Romania is the country with the most logistics terminals.

This question reflects the development level of the logistics network from the respective countries as well as the involvement grade of the company in these countries. As a result, Romania represents a bridgehead for this area in the South-East Europe, and the company Gebruder Weiss has here 6 logistics terminals with a very important role. At least two of them are important, the one in Bucharest where the head office of the company is, and the Cross Docking center in Sibiu which practically spreads the goods all over Romania also because it is in the center of the country. Bulgaria, Georgia and Macedonia are still at the beginning, the first two countries have only branches of the company. The one in Georgia was opened in 2016 due to a partnership between Gebruder Weiss and a company from this country. According to previous graphs, Turkey does not deal with the storing aspect, so this is the reason why it has no logistics terminal. Macedonia has only one rented logistics terminal so practically they are also just starting.

Discussion and conclusions

From the questionnaire based analysis regarding the way that the company Gebruder Weiss serves its clients, we have the following conclusions:

- The most important element regarding serving the clients is the speed in which the company meets its orders; four of the five countries mentioned the fact that this is an important element in performing its activity, that is, Bulgaria, Georgia, Turkey, and Macedonia.
- Also these four countries have a good developed highway network, so that the infrastructure allows them to answer orders on a short term.
- For Romania, an important element is consistency.

- The component that has an influence upon establishing a defense strategy for most analyzed countries, that is, four countries out of five, Bulgaria, Turkey, Macedonia and Romania, is the economic component (inflation, exchange rate, etc.)
- Performing the activity in the referenced countries can be affected in most cases by the constraints of political consideration and then in a lower percentage, by the inflation.
- The competition within countries with intense economic activity (Bulgaria, Turkey, and Romania) is higher, while in countries with less intense economic activities, the competition is naturally, lower.
- The biggest player on the logistics market from the five countries is DB Schenker
- Each country covers at least one of the four services between road, rail, sea and air transport, storing and consulting; the only country that also offers consulting is Bulgaria.
- Romania is the only country that encounters difficulties in performing the activity due to natural factors; in winter, due to snowfall and in summer due to flood.
- The customs formalities are complicated especially for the countries that are not EU members (Turkey, Macedonia)

References

Abrudan, I, Cândea, D.
2002
Ingineria şi managementul sistemelor de producţie, Editura Dacia, Cluj-Napoca
Ballou, R. H., Ronald, H.
2004
"Business Logistics/Supply Chain management", Fifth Edition, Pearson Education, Inc., Upper Saddle River, New Jersey
Bălan, C.
2006
Logistica (Logistics) 3rd edition reviewed and completed, Uranus Publishing, Bucharest
Bowersox, D. J., Closs, D. J., Cooper, M. B., Bowerso,x J. C.,
2012
Supply Chain Logistics Management, 4 th edition published by McGraw – Hill
Caraiani, G., Potecea, V.
2009
Logistica afacerilor internaţionale (Logistics of international affairs), University Publishing, Bucharest
Cătoiu, I. et al.
2002
Cercetări de marketing (Marketing Research), Uranus Publishing, Bucharest
Dumitraşcu, D., Fleischer, W. H., Moser, T.
2014
Analysis of the external general environment of the logistic market in Romania, Proceedings of the 4th Review of Management and Economic Engineering Management Conference (RMEE), 18 – 20 September 2014, Todesco Publising House
Miricescu, D.
2008
Managementul timpului – esenţa performanţelor organizaţiei (Time Management – the essence of the performance of the organization), Editura Universităţii Lucian Blaga din Sibiu, Sibiu
Miricescu, D.
2014
Semnele şi amprenta timpului asupra managementului contemporan (The signs and the marks of time on the contemporary management), Editura Universităţii Lucian Blaga din Sibiu, Sibiu
Miricescu, D., Moser, T.
2015
Aspects Of The Cooperation Between The Logistics Providers And Customers Within The Romanian Market, Rewiew of management and Economic Engineering, vol. 14 / no.3(57), Todesco Publishing House, Cluj-Napoca

Moser, T., Dumitraşcu, D., Miricescu, D.
2018
Logistics Management – Particularities and Tendencies –Growing organizational competitiveness and customer satisfaction through efficient management of logistics activities, LAP Lambert Academic Publishing
Moraru, G.M., Miricescu, D., Moser, T.
2014
Realities And Trends On The Romanian Logistics Market, Proceedings of the 4th Review of Management and Economic Engineering Management Conference (RMEE), 18 – 20 September 2014, Todesco Publising House
Stalk, G., Hout, T. M.
1990
Competing Against Time, The Free Press, Macmillan Inc. New York
Capgemini Consulting, PennState Smeal College, Penske Logistics, Korn Ferry
2016
2016 Third-Party Logistics Study - The State of Logistics Outsourcing, *Results and Findings of the 20th Annual Study*
Infosys Consulting, PennState Smeal College, Penske Logistics, Korn Ferry
2018
2018 Third-Party Logistics Study - The State of Logistics Outsourcing, *Results and Findings of the 22nd Annual Study*

IMPORTANCE OF BRAND PERFORMANCE MEASUREMENT – EVIDENCE FROM ROMANIAN COMPANIES

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Abstract

Purpose *– This paper aims to explore the importance of measuring brand performance and of the indicators that can be used for assessing how well a brand performs, among companies from Romania which exhibit a high level of organizational performance.*

Methodology/approach *– A marketing research was conducted, targeting the enterprises included in the National Top of Companies in Romania, a hierarchy of the firms with best performance in Romania. A survey was used as research method, whereas the research instrument was a questionnaire. A number of 153 respondents from these companies took part to the research.*

Findings *– Measuring how brands perform is important in almost 80 percent of the companies, but there exists a lot of room for improving both the actual performance of brands and the abilities that exist in the investigated enterprises for assessing brand performance. The analyzed brand performance indicators have high degrees of use, each of them being used in at least 76 percent of the enterprises. The most important indicators for measuring brand performance are consumers' willingness to recommend the brand and brand awareness, whereas the indicators that have resulted less important are brand knowledge, purchase intent and brand financial value.*

Research limitations/implications *– Due to the non-random sampling used, the results are valid only for the 153 enterprises and cannot be extrapolated to the level of all the firms included in the National Top of Companies.*

Practical implications *– The set of brand performance measures used in the research can provide guidance for marketing managers regarding the indicators they could use for assessing their brands' performance.*

Originality/value *– As marketing intangible assets, brands play an extremely important role for a company's marketing performance. Thus brand performance assessment proves of great value in the context of achieving and managing organizational performance. This study focuses on brand performance as a key dimension of marketing performance.*

Key words: *brand performance measurement.*

Introduction

According to a definition of the American Marketing Association, a brand refers to "a name, term, sign, symbol or design, or a combination of them, intended to identify the goods or services of one seller or group of sellers and to differentiate them from those of competitors" (Kotler and Keller, 2012, p.241). Nowadays a brand represents much more than a name or a symbol, as it encompasses "everything that a product or service means to consumers" (Kotler and Armstrong, 2012, p.241). Brands play an extremely important role for a company's relationship with its customers and next to the company's customers base, brands are considered the most important intangible marketing assets a firm can have. In this context, the "brand equity" concept refers to "the added value endowed on products and services" (Kotler and Keller, 2012, p.243), which reflects not only in the consumers' thoughts, feelings and attitudes towards the brand, but also in the prices the consumers are willing to pay for the brand, in the brand's market share or its profitability.

Although measuring a brand's performance is difficult, given its vital impact on a company's performance, it is absolutely necessary to assess how the brand performs. The marketing literature is rich in models proposed for measuring the performance of a brand and these models fall into two categories: research-based brand equity approaches and financially driven approaches (Lindemann, 2004, pp.5-6). The first category includes models that are based on consumer research, reflecting consumers' behaviors and attitudes that influence the brand's economic performance; these models usually employ a variety of perceptive indicators, ranging from brand awareness, knowledge and relevance, to brand purchase intent, consumers' satisfaction, preference and willingness to recommend the brand (Lindemann, 2004). The second category includes models that attempt to place a financial value on brands. These models use sophisticated econometric formulas in order to assess the brands and to justify the important place they occupy on the balance sheet. The complexity of this approach has spurred various marketing research companies to develop proprietary brand valuation techniques, which they use for assessing the value of popular brands. Probably two of the most famous techniques in this context are those developed by Interbrand and Millward Brown's BrandZ, which are used by each firm for annually developing lists of the most valuable 100 brands in the world (Krishnan et al., 2013). However, Ollins (2009) draws the attention to the fact that despite its importance, brand valuation, namely the process of estimating the financial value of the brand, should be approached in a cautious manner, and in his opinion, the most important way of ascertaining a brand's value resides in how much are the customers willing to pay for it.

Previous research conducted on 100 companies in Romania revealed that less than 40 percent of these firms used brand indicators like brand awareness, attitude towards the brand, purchase intent and brand financial value for assessing their brands' performance and even lower shares of the sample considered these indicators as very important – brand awareness was considered very important by 29 percent of the sample, attitude towards the brand by 26 percent, brand purchase intent by 17 percent, whereas brand financial value was considered very important by only 11 percent of the respondents (Bodea (Sava), Bacali and Avasilcăi, 2011; Sava and Bacali, 2012).

Performance of Romanian brands

Starting from the mid 2000s, the Romanian brands were subjected to different brand assessment exercises related to both perspectives that were previously mentioned – research-based brand equity approaches and brand valuation. One recent example for the first approach is a ranking of local brands, the BrandRo top, which is a hierarchy of the most powerful 100 Romanian brands. Developed by the Biz Magazine (Revista Biz, 2017), this ranking has reached its eight edition in 2017 and assesses the power of the Romanian brands from the perspective of trust and affectivity given to these brands by the consumers, without considering financial or commercial indicators. Each brand's performance is analyzed according to three criteria – brand importance, brand use and brand awareness, and the longer time a brand resists in the ranking, regardless of the economic or social changes that take place, the more powerful the brand is considered. For example, the latest edition of this ranking revealed that the most powerful ten Romanian brands were Borsec, Gerovital, Arctic, Farmec, Dero, Dorna, eMAG, Elmiplant, Napolact and Aqua Carpatica (Revista Biz, 2017).

In what concerns the financial value of Romanian brands, the first professional brand valuation of a Romanian brand took place in 2004, when a local brand consultancy company valued the brand Capital (a Romanian financial and economic weekly magazine) at 5.4 million euro (Brandient, 2004). Two years later, the first ranking of the 50 most valuable Romanian brands was developed (Brandient and BusinessWeek, 2006). The cumulated value of the three most valuable local brands at that time was of 951.3 million euro, and the three brands were Dacia, a brand from the automotive sector, and BCR (Romanian Commercial Bank) and BRD (Romanian Bank for Development), two brands from the banking industry. Although this study was not replicated in the following years, in 2008 it was estimated that the three most valuable brands had become Dacia, Petrom and Sensiblu (Bogdan, 2008). The last two years brought an important change in this landscape of Romanian brands valuation, as the Brand Finance agency developed a hierarchy of the 50 most valuable Romanian brands, both in 2017 and 2018. Although there are methodological differences between the two rankings, the one from 2006 and the one from 2017-2018, table 1 enables drawing some comparative coordinates between the most valuable ten Romanian brands in 2006, according to the top developed by Brandient and BusinessWeek Romania, and in 2018, according to the hierarchy developed by Brand Finance. A first result that draws attention is the change in the cumulated value of the top ten brands in both years; this has increased with more than 300 million euro, from 1417.7 million euro in 2006 to 1722.24 euro in 2018. A second observation refers to the fact that Dacia was the most

valuable Romanian brand in both years; however, its value has increased more than three times, from 387.4 million euro in 2006 to 1243 million euro in 2018. In addition, according to this year's ranking, Dacia is the only Romanian brand whose value exceeds 1 billion euro; the brands that ranked on the second and third positions have significant lower values, of 458 and 304 million euro respectively. Thirdly, only four brands from the initial top in 2006 can be found in the top ten of 2018 – Dacia, Petrom, BCR and BRD; however, if these two banking brands, BCR and BRD, were the second and third most valuable Romanian brands in 2006, in the 2018 ranking they are found much lower in the top, on positions 8 and 10, while this year's second and third positions have been occupied by two retail brands – eMAG and Dedeman.

Table 1. The most valuable 10 Romanian brands in 2006 and 2018 (Sources: Brandient and BusinessWeek, 2006; BrandFinance, 2018)

Rank	Top 10 most valuable brands in 2006			Top 10 most valuable brands in 2018		
	Brand	Sector	Value (million EUR)	Brand	Sector	Value (million EUR)
1	Dacia	Automobiles	387.4	Dacia	Automobiles	1.243
2	BCR	Banking	355.6	eMAG	Retail	458
3	BRD-GSG	Banking	208.3	Dedeman	Retail	304
4	Petrom	Oil & Gas	86.4	Petrom	Oil & Gas	194
5	Sensiblu	Retail	83	DIGI / RCS&RDS	Telecoms	186
6	Rompetrol	Oil & Gas	72.5	Banca Transilvania	Banking	148
7	Cristim	Food	62.8	Bitdefender	Technology	118
8	Asirom	Insurance	60.9	BRD	Banking	112
9	Altex	Retail	59.4	Electrica	Utilities	110
10	Domo	Retail	41.4	BCR	Banking	91

Research regarding marketing performance measurement

The remaining of this paper partly presents the results of a research aiming to investigate the practices used for assessing marketing performance among best performance companies from Romania, namely companies from the National Top of Companies from Romania, a hierarchy annually developed by the Chamber of Commerce and Industry of Romania. Eight distinct dimensions of organizational marketing performance were considered – market performance, brand performance, customer performance, marketing's financial performance and the performance of each of the 4Ps of the marketing mix (product, price, placement, promotion). The results of this research were partly previously disseminated, namely the results related to the overall marketing performance (Sava and Bacali, 2015), but also market performance (Bacali and Sava, 2013; Sava and Bacali, 2013), product (Bacali and Sava, 2015) and placement (Sava, Bacali and Boşcoianu, 2016) dimensions of marketing performance. This paper focuses only on one of the eight dimensions of marketing performance – brand performance.

Among the research objectives that underline the results presented in this paper were the following ones: to determine the respondents' opinion about the importance of measuring brand performance, about the abilities that exist in their companies for brand performance measurement and about the current level of their organization's brand performance; to identify the degree of use and importance of various indicators that can be used for assessing brand performance; to determine if there exists a relationship between the importance assigned to brand performance measurement and the importance levels assigned to brand performance indicators.

The brand performance indicators that were considered were selected from various proposals in the marketing literature (Aaker, 1996; Ambler et al., 2001; Keller and Lehmann, 2006; Kapferer, 2008; Jeffery, 2010; Bodea (Sava), Bacali and Avasilcăi, 2011; Sava and Bacali, 2012): brand awareness, brand relevance, consumers' knowledge about the brand, consumers' perception about brand differentiation in relation with other brands from the same category, attitude towards the brand, willingness to recommend the brand, brand purchase intent and brand financial value.

A survey based on the total investigation of the sample comprising all the companies included in the national top (2143 firms) was the research method employed, while a questionnaire was used as research instrument. This questionnaire included five-point scale questions, anchored by "very

important" and "not at all important", for capturing the importance levels assigned to both brand performance measurement and the eight performance indicators suggested in this respect; five-point scale questions, this time anchored by "very good" and "very weak", were also used for capturing respondents' opinion on the abilities that exist in their companies for assessing brand performance and on the current level of their brands' performance (Sava, Bacali and Boşcoianu, 2016, p.458). The questionnaire was sent by e-mail to all the companies included in the hierarchy developed by the Chamber of Commerce and Industry of Romania. A number of 153 valid returned questionnaires were used for data analysis. This sample of 153 companies included firms from all category sizes, all fields of activity and all regions of Romania; however, the sample was balanced between small (28.8 percent), medium (26.8 percent) and large (22.9 percent) enterprises, but clearly dominated by companies in the industry (40.5 percent) and services (29.4 percent) sectors, and by enterprises from the Bucharest-Ilfov (40.5 percent) and Center (22.2 percent) development regions of Romania (Sava and Bacali, 2015, p.217).

Research results

According to the results presented in Table 2, brand performance measurement is very important in 38.6 percent of the investigated companies and important in other 39.9 percent of the firms, in other words, a majority of 78.5 percent of the respondents considers that it is important or very important to assess how their brands perform. This result could suggest that the respondents acknowledge the importance of brands as marketing intangible assets and the role they play in the company's overall marketing performance.

However, when it comes to respondents' satisfaction regarding the abilities available in their companies for assessing brand performance, only 14.4 percent of the sample seem to be very satisfied with these abilities and rate them as being very good, with another 39.2 percent considering them good. These results leave the remaining 45.1 percent of the respondents not very satisfied in this respect, as they consider that the abilities for brand performance measurement are average, weak or very weak. Moreover, previous research has shown that from the eight dimensions of marketing performance that were considered, the respondents are the least satisfied with their abilities of assessing brand performance (Sava and Bacali, 2015, p.219). In addition, Table 2 reveals that approximately half of the respondents (51.7 percent) perceive their brands' performance as good or very good; however, the percentage of those that perceive a very good brand performance (14.4 percent) is much smaller than the share of those who assess a good brand performance (37.3 percent).

Table 2. Importance of assessing brand performance, ability for assessing brand performance and current level of brand performance (n=153)

How important is brand performance measurement in your company?		How do you rate your company's ability for assessing brand performance?		How would you rate the current level of brand performance in your company?	
Importance level	Frequency (Percent)	Ability level	Frequency (Percent)	Performance level	Frequency (Percent)
Very important	59 (38.6)	Very good	22 (14.4)	Very good	22 (14.4)
Important	61 (39.9)	Good	60 (39.2)	Good	57 (37.3)
Average importance	14 (9.2)	Average	37 (24.2)	Average	44 (28.8)
Of little importance	9 (5.9)	Weak	15 (9.8)	Weak	11 (7.2)
Not at all important	7 (4.6)	Very weak	17 (11.1)	Very weak	17 (11.1)
Total	150 (98.0)	Total	151 (98.7)	Total	151 (98.7)
No answer	3 (2.0)	No answer	2 (1.3)	No answer	2 (1.3)
Total	153 (100.0)	Total	153 (100.0)	Total	153 (100.0)

Table 3 presents the importance levels assigned by the respondents to eight performance indicators that can be used for assessing a brand's performance. In what concerns the use of these indicators in the 153 investigated enterprises, the results revealed that the most used indicator for assessing brand performance is represented by consumers' knowledge about the brand, as it is used in 90.8 percent of the companies. However, many of the other brand performance indicators are being used in very similar shares of the entire sample; brand awareness, relevance, perception about brand's differentiation and consumers' attitude towards the brand are each used in 89.5 percent of the companies, while consumers' willingness to recommend the brand is used in 88.8 of the enterprises.

The remaining two indicators from the analyzed set are slightly less used, as 78.4 percent of the firms use brand purchase intent, and 76.4 use brand financial value. Hence the analyzed brand performance indicators have high degrees of use, as each of them is being used in at least 76 percent of the investigated companies. In what concerns the importance assigned to these indicators in the context of brand performance measurement, if for each indicator the percentage of respondents that assigned the highest importance level is considered, it can be noted that the most important indicators are willingness to recommend the brand and brand awareness, considered very important by 47.7 percent and 47.1 percent respectively. The next most important indicators for brand performance assessment are brand relevance (very important according to 40.5 percent of the respondents), perception about brand differentiation (39.9 percent) and attitude towards the brand (34.6 percent). The remaining three performance indicators are considered less important for measuring a brand's performance; only 28.8 percent of the respondents consider that consumers' knowledge about the brand and brand purchase intent are very important in this context, whereas brand financial value is the least important indicator, as it received the highest level of importance in only 24.2 percent of the investigated companies.

Table 3. Importance of brand performance indicators (percent of the sample) (n=153)

Importance level / Indicator	Very important	Important	Average importance	Reduced importance	Not at all important	Do not use indicator	No answer	Total
Brand awareness	47.1	25.5	11.1	5.2	0.7	10.5	0	100.0
Brand relevance	40.5	29.4	13.1	4.6	2.0	10.5	0	100.0
Consumers' knowledge about the brand	28.8	32.0	21.6	7.2	1.3	9.2	0	100.0
Consumers' perception regarding brand differentiation	39.9	26.8	17.6	3.9	1.3	10.5	0	100.0
Attitude towards the brand	34.6	30.1	18.3	5.2	1.3	10.5	0	100.0
Willingness to recommend the brand	47.7	23.5	13.7	3.3	0.7	10.5	0.7	100.0
Brand purchase intent	28.8	25.5	14.4	5.9	3.9	19.6	2.0	100.0
Brand financial value	24.2	25.5	17.6	5.9	3.3	22.9	0.7	100.0

Stepwise multiple linear regression method was next used in order to test if a relationship exists between the importance assigned to measuring brand performance and the importance levels assigned to the eight brand performance indicators that have been taken into account (see Table 4). The dependent variable of the model was represented by the importance level assigned for assessing brand performance, whereas the independent variables consisted of the importance levels assigned to each performance indicator. The results revealed a statistically significant linear relationship between the importance level assigned to brand performance measurement (the dependent variable) and three predictor variables, namely the importance levels assigned to three brand performance indicators: consumer knowledge about the brand, brand relevance, and brand purchase intent respectively ($F_{3,107}$=23.4, $p<0.001$). As the value of R squared was 0.379, this means that approximately 38 percent of the variance of the importance assigned to brand performance measurement can be explained by the simultaneous contribution of the three predictor variables. The remaining five brand performance indicators were not included in the model, as they did not represent significant predictor variables for the dependent variable. Based on these results, it can be stated that assigning a higher level of importance for brand performance assessment is positively associated to higher importance levels assigned to the three brand performance indicators – consumer knowledge about the brand, relevance and purchase intent.

Table 4. Stepwise multiple linear regression of the predictors of the importance of brand performance measurement

Model statistics				
R^2	0.396			
Adjusted R^2	0.379			
F statistics	4.530			
d.f.	1, 107			
p value	.036			
Final predictors	**Unstandardized coefficients (B)**	**Standardized coefficients (Beta)**	***t***	***Sig.***
Importance of the „consumer knowledge about the brand" indicator	0.215	0.265	2.303	0.023
Importance of the „brand relevance" indicator	0.245	0.297	2.840	0.005
Importance of the „brand purchase intent" indicator	0.137	0.188	2.128	0.036

Conclusions

This paper focused on various aspects related to brand performance measurement, as part of a wider research that aimed to explore the practices employed by enterprises included in the National Top of Companies from Romania for measuring their marketing performance.

Almost 80 percent of the 153 respondents considered that measuring brand performance is important or very important in the marketing performance context, but only 14.4 percent were satisfied regarding the abilities that exist in their companies for performing this type of assessment and rated the current level of their brand performance as very good. Almost 90 percent of the companies use indicators like consumers' knowledge about the brand, brand awareness, relevance, perception of brand differentiation, attitude towards the brand or willingness to recommend the brand. The indicators that resulted as being the most important for assessing brand performance were consumers' willingness to recommend the brand and brand awareness, considered very important in 47 percent of the investigated companies. Another result revealed that assigning a higher importance level to brand performance assessment is positively associated with increasing importance levels assigned to three brand performance indicators – knowledge about the brand, brand relevance and brand purchase intent.

Brands and customers represent a company's most important intangible marketing assets and they have an incredibly high influence on organizational performance, both in the short and the long run. Therefore marketing managers should strive to improve the abilities for assessing their brand performance and to use various indicators that encapsulate it, in order to get a deep understanding of how their brands perform and contribute to the overall organizational performance.

References

Aaker, D.A.
1996
Building strong brands. New York: The Free Press.
Ambler, T., F. Kokkinaki, S. Puntoni and D. Riley
2001
Assessing market performance: the current state of metrics. Centre for Marketing Working Paper, No. 01-903, London Business School.
Bacali, L., and A. Sava
2013
"Assessment of the importance of market performance indicators for the firms from the National Top of Romania (I)." Actual Problems of Economics, 1(139): 236-245.
Bacali, L. and A. Sava
2015
"Research regarding product performance measurement in the context of marketing performance." Annals of the Academy of Romanian Scientists, New Series on Economy, Law and Sociology, 1(1): 59-68.

Bodea (Sava), L. Bacali and S. Avasilcăi
2011
„Research on practices used by Romanian companies for measuring marketing performance". Proceedings of the 2nd Review of Management and Economic Engineering International Management Conference „Management of Crisis or Crisis of Management", 15-17 September 2011, Cluj-Napoca, 238-246.
Bogdan, A.
2008
"Brandient: un brand românesc care vrea să fie în top zece trebuie să valoreze 200-300 milioane euro". Ziarul Financiar, 16.07.2008, http://www.zf.ro/companii/brandient-un-brand-romanesc-care-vrea-sa-fie-in-top-zece-trebuie-sa-valoreze-200-300-mil-euro-3085562/
Brand Finance
2018
"Romania 50 2018 The annual report on the most valuable Romanian brands".
http://brandfinance.com/images/upload/romania_50_2018_locked.pdf
Brandient
2004
"Capital este un brand cu greutate".
http://www.brandient.com/ro/noutati_si_opinii/interviuri_si_articole/capital_este_un_brand_cu_greutate.html
Brandient and BusinessWeek România
2006
"Top 50 cele mai valoroase branduri româneşti".
http://www.brandient.com/downloads/brandient_top50_2006_ro.pdf
Chamber of Commerce and Industry of Romania
2010
National Top of Firms from Romania, ed. XVII. Bucureşti.
Jeffery, M.
2010
Data-driven marketing: the 15 metrics everyone in marketing should know. New Jersey: John Wiley & Sons.
Kapferer, J.N.
2008
New strategic brand management: creating and sustaining brand equity long term. 4th ed. London: Kogan Page.
Keller, K.L. and D.R. Lehmann
2006
"Brands and branding: research findings and future priorities." Marketing Science, 25(6): 740-759.
Kotler, P. and G. Armstrong
2012
Principles of marketing. 14th ed. Pearson Prentice Hall.
Kotler, P. and K.L. Keller
2012
Marketing management. 14th ed. Pearson Prentice Hall.
Krishnan, V., U.Y. Sullivan, M.D. Groza and T.W. Aurand
2013
"The Brand Recall Index: a metric for assessing value". Journal of Consumer Marketing, 30(5): 415-426.
Lindemann, J.
2004
"Brand valuation: a chapter from *Brands and Branding*".
http://btcvalue.vn/hinhanh/file/BrandValuation(AChapterFromBrandandBranding).pdf
Ollins, W.
2009
Manual de branding. Bucureşti: Vellant.
Revista Biz
2017
"Top 100 cele mai puternice branduri româneşti 2017". http://www.revistabiz.ro/top-100-cele-mai-puternice-branduri-romanesti-2017/

Sava, A. and L. Bacali
2012
“Use of marketing indicators in some firms from Romania.” Proceedings of the 3rd Review of Management and Economic Engineering International Management Conference “A new dilemma: between East and West”, 13-15 September 2012, Cluj-Napoca, 142-148.
Sava, A., and L. Bacali
2013
“Assessment of the importance of market performance indicators for the firms from the National Top of Romania (II).” Actual Problems of Economics, 4(140): 472-479.
Sava, A., and L. Bacali
2015
“Research regarding marketing performance measurement in companies from the National Top of Companies in Romania.” In O. Nicolescu, C. Oprean and M.A. Titu (eds.) The Best Romanian Management Studies 2013-2014: 213-226. Saarbrucken: LAP LAMBERT Academic Publishing.
Sava, A., L. Bacali and M. Boşcoianu
2016
“Research regarding the measurement practices of distribution performance as a component of marketing performance”. Proceedings of the 5th Review of Management and Economic Engineering International Management Conference “From Management of Crisis to Management in a Time of Crisis”, 22-24 September 2016, Cluj-Napoca, 456-462.

CURRENT APPROACHES TO THE ORIENTATION TOWARDS REQUIREMENTS IN THE DEVELOPMENT OF EDUCATIONAL SPACES AND ENVIRONMENT. SITE USAGE REQUIREMENTS

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Abstract

Purpose *– This research paper will focus on the usage requirements and not on the regulatory requirements.*

Methodology *– Research was carried out on the basis of the secondary data analysis method.*

Findings *–It suggests its own solutions for identifying and distributing the main requirements regarding the fundamentals of designing educational spaces so that they respond to the needs presented.*

Research limitations/implications *– In order to address this issue, starting from the usage requirements and the satisfaction quests, identified from secondary sources, manifested at the global level, currently in direct connection with the design of the educational spaces, a methodology will be developed, in the future, to solve important aspects, structured in four directions, as follows: location, major building characteristics and interior space configuration.*

Practical implications *– We want to show the current approaches to the new orientation towards requirements in the development of educational spaces and environment.*

Originality/value *– This paper is an incurs in the spectrum of some theoretical elements related to the site and makes an inventory of some of the identified and proposed requirements: integrating the new architectural program into the city context, developing and activating/reactivating certain areas within the urban area, the existence of a degree high level of accessibility and community integration in the school space, the existence of green space on the site or in the neighbourhood, the possibility of extending existing school spaces, sustainability and ecology.*

Key words: *design, educational spaces, usage requirements.*

Introduction

In this dynamic world, every development project, even in the field of educational spaces, it is based not only on the investigation of demands, but also on proactive attitudes, including the cultivation of the tastes of the stakeholders.

The requirements considered in the development of educational spaces are divided into two categories: regulatory requirements and usage requirements.

The regulatory requirements include: the suppression requirements of political-legislative system, for example the European Union, and the macro environment requirements of political-legislative system in our country.

The usage requirements of all stakeholders, but especially the direct beneficiaries, include:

- objective requirements, deriving from the basic functions of holistic, integrated, but also individualized educational spaces;
- subjective requirements that are constantly changing and need to be investigated permanently, especially from primary sources, using a specific sociological research methodology applied to a well-defined stakeholder segment in the design, construction, management and monitoring of educational settings (trainees, teachers, auxiliary and non-teaching administrative staff, parents, associations and foundations, companies, community, public bodies, etc.).

Theoretical background

The concepts of site use requirements

Table 1 proposes a possible generalized matrix of major use requirements identified for the educational spaces from the dimension surveyed, the location that represent the subject of this article.

Table 1: A proposal on the global picture of the major use requirements identified regarding the location of the educational premises

Site use requirements	Integrating the new architectural program into the city	Development and activation/ reactivation of certain areas within the city	Existence of a high degree of accessibility	The existence of green space on the site or in the neighborhood	Integration into the community and community integration in school space	The possibility of extending the existing spaces within the schools	Sustainability and ecology
Functional	X	X	X	X		X	
Space	X					X	
Technology						X	X
Environmental		X	X	X			X
Social	X	X		X	X	X	X
Cultural					X		X
Economic		X			X	X	X
Political					X	X	X
Aesthetics	X					X	X

Integrating the new architectural program into the city

When discussing the integration of a new building into the context, we can look at this from several points of view: functional integration, community integration, integration into urban fabric, visual and formal integration.

Development and activation/reactivation of certain areas within the city

In nowadays there are constantly encountered problems with the degradation of built-up areas, with abandoned and declining industrial spaces, lack of green areas, poor infrastructure, or other elements that lead to problems of quality of the environment in general. In the present century, there is a wide range of architectural programs, including educational buildings, which possess a huge capacity to develop and activate certain zones within an urban area.

Lately, an increasingly number of urban regeneration projects have begun to be brought to life in certain urban areas from a physical, economic and social point of view, therefore increasing the quality of the environment, the social climate, and local economy.

Urban regeneration, from the perspective of the European Union, contains a series of valences, as follows (Ginavar, Blum, Marin, Popliceanu, Gherghinescu, Vrabete and Frentz, 2007):

- the intervention of public authorities in urban areas in the process of degradation: education-al institutions, military, historical centres, industrial areas, collective housing blocks;
- the integrated approach of the intervention sectors to meet the territorial, economic, social and environmental optimal allocation/reallocation requirements;

- adequate city governance, enabling strategic decisions to be taken in partnership with all actors involved;
- integrating European urbanism policies with national and local ones, with the EU supporting urban regeneration, including structural funds allocated to urban planning programs.

Urban regeneration represents a paradigm of thinking and approach to integrate, participatory and global urban development. In some European countries, including France and Spain, urban regeneration existed before setting urban policy coordinates at the European Union level, and in other countries, like Greece or Portugal, it was supported through community initiatives.

To plan an educational construction that responds and communicates with the neighbourhoods of the site, the context and the local community, it must be considered to have its own peculiarities. A standardized building will never work as efficiently as one designed for a specific community, as we have seen in the standardized schools of the industrial age. For this reason, the current trends are to involve the local community in the designing process of new buildings, to better understand the requirements of the society, to identify the existing and future potential, but also to strengthen the local identity.

A good example is the Usasazo Secondary School, in 2004, in the southern African city of Khayelitsha. Wolff Architects have taken in consideration from the beginning that this project is not one that generates a simple learning space, but a secure and stable space within the community, which it can also enjoy it. "In an area like Khayelitsha, schools are often the first public buildings and, for a long time, the only permanent, durable and expensive buildings. Therefore, schools play a critical role in the formation of qualitative urban areas." (Wolff Architects, 2018)

Looking at the American continent, it stands out the particularities of the Elmer A. Henderson School: The Johns Hopkins Partnership School in Baltimore, adopted to turn this institution into a catalyst for the entire urban area. Developed in 2004, by Rogers Partners, the school provides space for approximately 100 employees, 175 preschools and 540 students between the first grade till the eighth grade.

The architectural form of the school was inspired by the typology of the existing habitation in the Baltimore's eastern area. The architects were taking on the idea of staggered volumes, with a low height regime, densifying and rebuilding the urban fabric according to its own rules and preserving its characteristic image.

Desiring to gain a flexible space to accommodate diverse functions and an environment for experimenting with new teaching/learning methodologies, this school was built by a non-profit developer called East Baltimore Development, along with the community, government and business world representatives. The aim was to regenerate the eastern part of the city, these developers were convinced that a public institution will provide the basis for a good function of a community or neighbourhood (Chiles, 2015). To accomplish this, the educational purposes have been added to functions for the inhabitants of the area, such as: a library, a health centre, a space for gatherings or shows, and a sports hall.

In addition to these punctual examples, it is worth mentioning that, especially in Western European countries, specific programs started to appear in the 2000s, designed to improve the schools in the problematic communities or institutions that have achieved unsatisfactory results in the national testing. A specific attention has been shown to London's Hackney Quarter, considered to be one of the most economical and culturally resource-free areas in England. These economic shortcomings have emerged because of the considerable number of people without jobs, a situation which, in turn, resulted from local disinterest towards academic achievements or education in general (Team Hackney, 2018). Since 2004, thanks to the program, five new schools have been built in the area, most of them being located on new sites suited to the architectural plan. The English Government was focused on raising educational standards in general, but the UK Academy Program takes advantage of these problematic areas to turn them into urban regeneration opportunities (Burke, 2009; The Guardian, 2018a; The Guardian, 2018b).

Existence of a high degree of accessibility

When talking about the accessibility of a site, is referring first to its location and to the means of transport that link the setting with the rest of the city. In this way, the quality of the area increases with the number

of: car routes that are in the immediate neighbourhood, public transport and existing pedestrian paths, parking spaces that are at the disposal of the institution, or in the vicinity.The site sustainability should be considered in the selecting process. LEED (Leadership in Energy and Environmental Design) is a program that includes a specific section for educational buildings, where are shown the elements considered important at the level of location and transport based on (LEED, 2018):

- the capacity and manner of the new building to revitalize a certain area (avoiding the development of functions on inappropriate sites, reducing the distance travelled by road vehicles, encouraging daily movement and maintaining physical health);
- protecting "sensitive" areas (avoiding the development of the fund built in protected areas, reducing the environmental impact of the assessed construction);
- the importance of the site (encouraging developers to choose difficult or restrictive sites and promoting health in the area);
- surrounding density and ability to use functions in a variety of ways (preservation of unoccupied, agricultural land or having different types of natural habitats by encouraging the development of the fund built on sites that have an infrastructure);
- access to a quality transport (encouraging the development of the fund built in locations where there are more and more diverse modalities of transport, therefore reducing the amount of toxic gas emission and air pollution);
- the existence of bicycle transport infrastructure (promoting the use of bicycles at the expense of road vehicles, promoting efficiency at the level of transport and reducing the distances covered, increasing public health by encouraging physical education, both for commercial and recreational purposes);
- reducing the footprint of the parking area (minimizing the negative effects associated with these types of areas);
- the existence of sustainable vehicles (reduction of pollution due to the promotion of alternative vehicles).

Most educational buildings are encountered in a more or less developed urban context, but if the institution is more complex or much larger, the campus organizations are preferred and usually located outside the cities due to the huge area of land needed. In these situations, achieving a high degree of site accessibility is often a challenge, but the requirements remain as important and necessary.One example could be the ABA (Architectural Barriers Act) or ADA (American Disabilities Act) standards found on American soil, which provide a basis for guidelines to address this issue. Over time, school, in general, and all educational buildings played a fundamentally role in the development of a society. As has been pointed out above, for a school to become a catalyst, but also an integrating factor in the development system of social activities within the community, the issue of accessibility into educational spaces under its many valences is of major importance

Integration into the community and community integration in school space

The traditional forms of educational buildings are clearly separated from the community, the mainly reason is student security, but also because school institutions are an entity that needs to work after laws and principles. However, the community represents a whole interdisciplinary environment that is seen as a sign in the educational process and as a huge source of teaching material, at the same time. Parks and green areas can contain information about nature, ecology, biology or science, the business environment could provide ideas about skills, economics, math, or different programs and ways of work, the culture and history can be learned from the city's art galleries, theatres, cinemas and museums, the government buildings can create a system of legal, political and civic values. For a school to function in conjunction with the community it belongs to, it must maintain an open character, both at the architectural and the theoretical level (Taylor, 2008; Clark, 2010).

The existence of green space on the site or in the neighbourhood

The human needs are directly related to the natural setting and it is most felt among young people. The landscape and green space must become an extension of a modern school building and its quality to be large enough to wake up the interest in spending as much time as possible in this setting. The outer space of an educational construction can enhance both the educational experience and the institution's connection with the community in which it is located (Bogner, 2002; World Health Organisation, 2010).

A quality school building is bound to utilize the available land in the most appropriate and efficient way to provide new learning and development opportunities in general. More attention is paid to the outer space, with the school's courtyard containing stimulating staff, ecological diversity, and closely linked to the topography of the site and its natural elements.

Sustainability and ecology

The most commonly used green building assessment and certification program is LEED (Leadership in Energy and Environmental Design). It is a complex and integrative approach, including site layout. The following conditions must be met for the site to be considered a sustainable one (Burke, 2009):

- prevention of pollution from the construction process (reduction of pollution caused by various site activities at the time of construction, control of soil erosion, sediment or dust);
- assessing the site from the perspective of environmental issues (protecting the health of more vulnerable populations by ensuring the evaluated sites are uncontaminated);
- site evaluation (evaluation of existing site conditions and possibilities of integrating the various sustainable options within the site);
- site development - preserving or restoring a habitat;
- open space (creation of open outdoor spaces, encouraging the population to social interaction, passive recreation and physical activity);
- rainwater management (reducing the unused pluvial water volume and increasing the water quality due to site-specific hydrology replication);
- reducing light pollution (improving night time visibility as well as reducing the consequences of developing built-up funds on the population and the habitat);
- master plan of the site (existence of a larger scale plan on the project, ensuring that the positive effects of the sustainable site are preserved, in the event of a functional change or in the demographics of the community);
- typical use of spaces/functions (integration of the school program within the community through common spaces and functions where it can carry out various activities outside the school curriculum).

Conclusions and recommendations

The issue of the location of educational spaces somewhat resembles to the iceberg case, because the school has an overwhelming importance, although in the past and even today, in some situations, proper attention has not been shown to it. Its role being invisible to many decision-makers, the most significant part of the iceberg cannot be predicted or deducted according to the reality.

The contribution in this paper consists in making original proposals related to the topic of designing the educational spaces. The approaches, starting from synthesizing the existing points of view in the specialized literature, as well as from the inventory of the practical manner of displaying the tendencies that conform to the specifications of the location of the educational buildings and its importance in the world. The authors synthesized and categorized the existing and potential requirements (usable primarily in educational settings in countries that do not yet provide a significant importance to education) regarding the location of educational spaces and the current tendencies to meet these needs identified especially at the architecture level and designing process of educational organizations.

References

Ginavar, A., Blum, I., Marin, V., Popliceanu, E., Gherghinescu, O., Vrabete, M., Frentz, G.
2007
O sansa pentru orasul tau! Ghid informativ privind regenerarea urbana, Ministerul Dezvoltarii, Lucrarilor Publice si Locuintelor, Bucuresti, pp. 12
Wolff Architects
2018
The design of the Usasazo Secondary School attempts to perpetuate and formalise the street character of this area in Khayelitsha Available online: http://wolffarchitects.co.za (12 March 2018)

Chiles, P.
2015
Building Schools- Key Issues for Contemporary Design, Birkhauser, Basel, pp. 100
Team Hackney
2018
Available online: http:/www.teamhackney.org/economic-development (10 February 2018)
Burke, C.
2009
Inside Out: A Collaborative Approach to Designing Schools in England 1945-1972, Paedagogica Historica, 45(3), pp. 421-433
The Guardian
2018a
Is Mossbourne academy's success down to its traditionalist headteacher? Available online: https://www.theguardian.com/education/2010/jan/05/mossbourne-academy-wilby-profile (6 May 2018)
The Guardian
2018b
Ten Mossbourne academy students win Cambridge University offers Available online: https://www.theguardian.com/education/2011/jan/23/mossbourne-academy-cambridge-university-offers (6 May 2018)
LEED, Leadership in Energy and Environmental Design
2018
Available online: https://www.usgbc.org/sites/default/files/LEED%20v4%20BDC_07.8.17_current.pdf (20 February 2018)
Taylor, A.
2008
Linking Architecture and Education: Sustainable Design of Learning Environments, University of New Mexico Press, Albuquerque, pp. 247
Clark, A.
2010
Transforming Children's Spaces: Children's and Adults' Participation in Designing Learning Environments, Routledge, London, pp. 43
Bogner, F.X.
2002
The influence of a residential outdoor programme to pupil's environmental perception, European Journal of Psychology of Education, 17, 1, pp. 17, 19-34
World Health Organisation
2010
Socio-environmentally Determined Health Inequities Among Children and Adolescents, pp. 4

Performance Management: Guidelines and Practices

ROMANIAN BUSINESS - BETWEEN MORALITY AND LEGALITY

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Abstract

We are witnessing these days how doing business is redefined, even if the goal remains definitely the same - making profit. The article presents the manner in which the business environment perceives these changes and tries to adapt to them.What does business ethics means? What should an entrepreneur know about ethics? Is it understood as a simple act of charity of the business owner, by the mean of sponsorship of activities or offering money/gifts to disadvantaged people (given that Romanian companies are not subject to social audit as it happens in developed societies with tradition in doing business)?

Purpose *– Regarding the notion of business ethics, the analysis aims at highlighting how Romanian companies perceive it, either as a profit-making strategy or just a fashionable practice, a management strategy or just a method copied from multinationals.*

Methodology/approach *- In order to analyze the nature of problems faced by Romanian entrepreneurs, we point out the study performed by the CNIPMMR Department of Analysis and Surveys, which shows that 44.64% of the respondents consider the Romanian economic environment to be unfavourable to business development, while only 25.50 % believe it is favourable for entrepreneurs and the main obstacles in the activity of SMEs are generated mainly by the state institutions in their interaction with the market. The SME sector is most sensitive to evolutions of the business environment, being the first to react to frequent legislative changes. Currently, there is a struggle of Romanian SMEs for survival, and there can not be much ado about ethics or social responsibility under these conditions. The Romanian business approach seems quite simplistic: "what is legal or is not forbidden, is allowed", without even considering that not everything that is legal is moral as well.*

Findings *– From all the analyzed data, we have found that the Romanian firms are of a traditionalist nature, with a conservative structure, where the lack of transparency is visible. Another common mistake is that there is confusion between shareholders and management, most of the entrepreneurs considering that if they have the necessary capital to start the business its success is guaranteed. They do not give the business idea enough importance either. At the same time, they do not even have a vision or image of their business and they do not anticipate its evolution under the conditions imposed by the law.*

Research limitations/implications *– Romanian business environment does not give importance to the anticipation of business environment's evolution; neither does it take into account, when initiating a business, the expectations of the community they belong to nor the communication's significance, as a way to make known the values on which the business is based and to understand the interests of those who depend on it.*

There are nowadays two opinions on business ethics in Romania: some support the idea that Romanians are keen to copy Western models and try to incorporate those into an old-fashioned and traditionalist Romanian reality and others consider ethics in business a necessity in Romania, given that corruption and bureaucracy are the main factors standing in the way of a functional, efficient and competitive market economy.

Practical implications *– We consider that the Romanian business environment does not currently distinguish between legality and morality, perhaps due to the fact that we do not have a mature enough free market and legislative changes are common (there is even overregulation of some areas or legislative speculation, thus making the creation of norms and ethical business practices more difficult). Most of the problems faced by the Romanian business environment are: corruption, conflict of interests,*

bureaucracy, and the following major sources of ethical issues were identified: legislative uncertainty, financial market interventions and price policies for some of the basic products, as well as the unfair and some at the limit of legality practices regarding the employee-employer relationship.

***Originality/value** – Even if it is seen as an indirect requirement for becoming attractive to foreign capital, the Romanian economy is forced to adopt new models of doing business. We must also mention the pressure exerted by the international economic structures to which Romania has adhered, the most important of which is the European Union, which imposes moral requirements in the Romanian economic life. But we believe that, above all, it is necessary to report the situation of Romanian economic practice to the current concerns of business ethics.*

***Key words:** Ethics, legality, business environment, entrepreneur, development.*

There are many factors that can stimulate the development of ethical consciousness until it reaches the higher stages of evolution, but one of the most important is education. Ethics, in its capacity of universal and objective self-regulation, is not always present or obvious in the behaviour of Romanian companies, because not all of them have the same level of ethical competence. Ethical behaviour requires reason to control will, which is gained both through learning, but especially through practice, through exercise. Thus, the perception of ethics as a peripheral component of business practices can be changed into the status of basic component of Romanian companies' activities.

Analyzing Romania's economy after 1989, can be noticed that it has witnessed a decade of economic instability and decline, determined to a certain extent by an overrated material base and the lack of coherent structural reforms. Another problem of that period can now be categorized as a "severe decompression syndrome", in fact an exuberant manifestation of all forms of private initiative after so many years of repression, described by the emergence of too many political parties, too many universities, etc. However, Romania has undergone important economic transformations since 2000, becoming an economy based on a relative macroeconomic stability and characterized by sustained growth, a low unemployment rate and a declining inflation rate.

Consequent to the privatizations and reforms that took place in the late 1990s and early 2000s, there was a much smaller intervention of the state on the Romanian economy compared to other European economies. The global economic crisis manifested in the period 2007-2009 had an impact on all economic sectors in Romania, determining the considerable fall in demand, the increase in the number of loans and the instability of national currency's exchange rate.

It was perhaps the period in which Romania acknowledged the true face of capitalism, which can only exist with the value carriers of capitalist practices. The reaction of Romanian business environment was also slowed down by the fact that in the Romanian economy before '89 there were no "islands of capitalism" and all that was related to "entrepreneurial spirit" was quickly discouraged. The context of the global crisis was the moment when the most pressing questions were raised about the principles that should govern the actions of Romanian firms.

The Romanian economy was also under the pressure of economic, technological and political forces, subject to the process of economic internationalization in the era of globalization: "the world economy is formed through the globalization process of markets" (Andreff, 1996). Practically, we are witnessing the transition from classical business to a more complex configuration, "in which the ever-increasing merger and interdependence of commercial, technological, investment and services flows are coordinated more and more through global networks, facilitated by the spectacular technological advances in the field of informatics and telecommunications " (Bădescu, 2014).

We can say that we are witnessing an increase in business complexity under all aspects. From the perspective of global capitalism, businesses must be reconsidered in terms of the highest and most comprehensive horizon of human thinking, i.e. the ethical reflection, and "business ethics should not be the ethics applied to business, but the very foundation of business" (Lewis, 1985). Beyond any socio-economic context, it is obvious that people, and especially business people, need an ethical system focused on values such as responsibility and honesty. Referring to the Romanian economic context, it is important for businessmen to realize that it is more profitable in the medium and long term to develop

their own morality to attract business profits, relying on the fact that the stronger this morality is, the more it will help strengthen the company's reputation.

Asked about the significance of the term ethics, US businessmen gave some of the following answers: "Ethics has to do with what my feelings tell me is good or bad; Ethics is related to my religious belief; To be ethical means to respect the law; Ethics is the pattern of behaviour accepted by society; I do not know what this word means."(Mitchell, 2003)

It can be observed that the rupture between the philosophical ethics of business and business practitioners is explained by the morally problematic character of the "business purpose".

The question of ethical nature in terms of business is by what means and with what consequences is profitability achieved? At present, any man, with or without economic training, agrees that the term business ethics coexists with the idea of fair, honest behaviour in the sphere of commodity exchanges or business of any kind. This means that society is willing to accept that elementary morality (do not steal, do not lie) encompasses not only direct or public interpersonal relationships but also the various activities contained in the phrase "business".

In the specialized literature, the approach to defining ethics in business is not a new one. The most popular views define it like "the ethical perspective, whether implicit in behaviour or explicitly stated, of a company or individual doing business" (De George, 1990). So business ethics is at the level of a description of what an economic agent actually declares and does in relation to certain ethical considerations.

Other authors consider ethics to be "that set of principles or arguments that should govern conduct in business, individually or collectively" (Lewis, 1985). According to this definition, we should agree that there are things that business people should not practice in their work, ethics delimiting the norms of moral behaviour.

A more realistic and more accepted definition in practice would be: "business ethics is the study of how personal moral norms apply to the commercial firm’s activities and purposes. It is not a separate moral standard, but the study of how the business context draws the moral person’s attention, acting as an agent of this system, on its own specific problems "(Nash, 1995).

In the opinion of Romanian specialists, business ethics is "an economic ethos, defined as a particular form of applied ethics, a set of moral norms aimed at the conduct of traders in economic activity, both individually and collectively" (Iamandi, 2008).

There are many businessmen who show their scepticism about the relevance of business ethics, both to their current problems and to the practical dilemmas they face in their day-to-day work.

Both the development and the practical course of business are at certain levels of morality, fitting into Kolhberg's moral development model (1981), put in the context of six-step businesses (Starcher, 2003), further analyzed from the Romanian economic perspective:

- The first step is the debut of moral rationality and can be described by the conceptual expression: "power, force means the foundation of justice." At this stage, the will is most powerful, using physical or material strength when needed. It is the "law of the jungle", synonymous with the total lack of moral awareness, a stage that can easily be recognized in the ’90s in the Romanian economy, when there was also a legislative vacuum in the economic field;
- The second stage can be surprised by the phrase: "everything is admitted", which happened in Romania from the end of the 90s until first half of the 2000s. It was the stage where the Romanian entrepreneurs believed that they can do anything to get the highest profits as long as they are not discovered. It is the period when there was a non-payment of taxes at large-scale, translated by tax evasion at the highest odds, bribes offered to officials, or practices such as false customs declarations and non-compliance of agreements. At this level, the reasoning quite frequently heard in the Romanian business environment is "Do not ask how I made the first million";
- The third stage has the following generic characterization: maximization of short-term profits. At this stage, acceptable business practices are taken into account, both legally and socially, but the only goal is to maximize short-term profits without considering social aspect, respecting M.

Friedman opinion that "social responsibility of business is maximizing the profits." It corresponds to the beginning of the 2000s, when the Romanian businesses were set up and disappeared just as fast, following the obvious goal of profit.

- The fourth stage corresponds to the following characterization: maximizing long-term profits. It is the stage in which the need to maximize shareholders' profits was realized, targeting longer-term objectives. It is the period after the mid-2000s, when Romanian businessmen began to think about the idea of a healthy and sustainable business, and the shareholders began to be willing to think of a "more general interest". It is the period in which Romania has prepared for integration into the European Union, when legislative measures were predominantly taken, which has led to some compliance of the business environment with the law.
- The fifth stage is characterized by the concept of a stakeholder, so that the economic and social mission of firms must also take into account the interests of other private groups such as: customers, suppliers, employees, the local or regional community, without putting first the strict interest of shareholders. At this level, in addition to financial considerations, firms also need to keep track of indicators such as product / service quality, consumer satisfaction, social and professional development of employees, environmental protection. It is, in fact, the stage that is currently undergoing in the Romanian business environment, but being an "imported" concept, the compliance is, at least at present, more at declarative level.
- The sixth step can be characterized best by the concept of a citizen-social enterprise. This stage has the task of redefining economic activity in society. Reasoning at this level takes into account a few facts considered fundamental for today's world: a) there are serious problems for mankind; b) the world of business must play a crucial role in solving them, c) an entrepreneur at this level of consciousness will not be animated only by financial stimuli, but also by the idea of doing good in society. Such a stage corresponds to the concept of "moral community" (Rachels, 2000).

The analysis of managerial practices in Romanian companies indicates that business ethics is not yet a problem that concerns the Romanian entrepreneurs, some of them considering that making profitable business and having ethical behaviour are mutually exclusive issues. These phenomena, like the lack of responsibility and honesty in business, cannot be considered shocking if we carefully look at the phenomena specific to the transition period from a centralized economy to a capitalist one.

The individuals' lack of morality has the social instability as consequence. Unless there is a solid moral base, the situation escalades to serious political disturbances. That is the situation in Romania at the moment. Although ethical behaviour does not seem to contribute to the prosperity of a company in the short term, moral conduct helps stabilize and even increase its profit in the long run.

Lawfulness and morality of business are two components of the social order that coexist, the first of which comes mostly from the second, so morality is not considered a source of law. It can be said that the legal basis is a moral basis, but a little more limited, but the two components of social order have the same purpose of regularizing social relations and orienting the activities. Social order is not self-imposed; it is the result of some actions taken by primary social groups and political, legal, educational, and religious organizations. In Romania, the business activity is regulated by a series of normative acts stipulated mainly in the Fiscal Code and Labour Code.

Analyzing the Romanian business environment, where 99% of firms are SMEs, it can be noticed that there are no ethical codes explicitly formulated at this level, but only internal regulations, representing in fact a formal compliance with legal obligations, because, according to the provisions of Article 246 of the Labour Code, the employer has the possibility to implement at the level of enterprise his own rules and policies, as long as they are legal. By drawing up the internal regulations, the employer undertakes to observe the legal provisions laid down in the Labour Code (2003), and the provisions of internal regulation must be circumscribed to the principle of good faith of the participants in the employment relationship and it must not contain immoral regulations or obligations: a) rules on protection, hygiene and safety at work within the unit; (b) rules on respect for the non-discrimination principle and the removal of any form of break of dignity; c) the rights and obligations of the employer and those of the employees; d) the procedure for solving individual claims or complaints of employees; e) concrete rules on unit labour discipline; f) disciplinary misconduct and applicable sanctions; g) rules on the disciplinary procedure; h) the arrangements for the application of other specific legal or contractual provisions.

A study that took into account the size of SMEs (Nicolescu et al., 2017) in Romania found the following: microenterprises have the most frequent negative perceptions and the least frequent positive

appreciations both in terms of current status and the future evolution of business environment; small firms hold the highest percentages of entities where the economic environment is / is expected to be / would be favourable to business development currently and in the future. In the same study, regarding the contextual developments that are considered to have a negative impact on the activity and performances of SMEs, the most frequently mentioned were the legislative framework evolution (45,80% of all investigated companies), corruption (29,20%), global economic crisis (26.64%), excessive bureaucracy (26.64%), policies of the Romanian banks towards the companies (24.82%) and the insufficient capacity of the Government and Parliament to counteract the effects of future global crisis (23, 81%).

In this period, the ethics of firm's decisions is the most discussed topic. There are frequent situations in which entrepreneurs / managers of companies are involved, when important aspects of social life that are likely to harm society in general are ignored or neglected. It is easily ignored the fact that business decision also has an ethical component, by the mean of which is established and imposed a conduct that has to be in accordance with certain fundamental values, rules, principles, laws and norms. Under these circumstances, natural managerial practice should be a favourable attitude towards the behaviours, concepts, ideas and models that ethics states, the science that provides the moral coordinates of man's existence and activity. The main factors determining the level of managerial ethics are the legal regulations, the community's rules and regulations, the ethical codes of economic activity sectors, the internal regulations of companies, the firm's status and its individual characteristics, as well as the social pressure.

If we refer to the Fiscal Code, then we cannot fail to notice the approximately 261 changes done in 2018, after another 178 changes in 2016, the effects for the Romanian business environment being translated into the loss of opportunities, i.e. fewer jobs, less taxes for the state budget and loss of the benefits that any potential investment can bring.

The idea of making a code of ethics should be based on the employee's opinion, seen as very valuable. Codes of ethics and professional conduct, that is those documents containing rules governing the moral and professional aspects of an enterprise, must be based on the values and principles of that enterprise's employees, otherwise, the following question arises: "How can you ask an employee to respect a code of ethics to which the employee does not feel attached because it does not contain values he shares? The process through which employees are involved in identifying their common values to develop a valid ethical code at the firm's level is a complex one.

Conclusions

The reality of Romanian business environment shows that many companies do not act ethically and their business activity is based on other concepts, some of them even contradicting the requirements of ethics and responsibility. In the new context, business ethics must be part of the foreseeable evolution of Romanian firms, although at present not everybody is convinced of the necessity of ethics to rule on the conduct of economic agents. Over time, however, Romanian entrepreneurs / managers will certainly take into the account fairness and legality in business decisions, even only from the perspective of increasing profitability and will reflect on the consequences that business decisions have on society in general.

References

Andreff, W.
1996
Les Multinationales globales, Paris, France, Editeur: La Decouverte
Bădescu, V.S.
2014
Etica în afaceri, București, România: Editura ProUnivessitaria
De George, R.T.
1990
Business Ethics. (3rd ed.). New York: MacMillan

Iamandi, I.E. & Filip R.
2008
Etică și responsabilitate socială corporativă în afacerile internaționale. București, România: Editura Economică
Kohlberg, L.
1981
The Meaning and Measurement of Moral Development, Worcester, Mass.: Clark University Press
Lewis, P.V.
1985
Defining 'business ethics': Like nailing jello to a wall. Journal of Business Ethics 4(5), 377–383. https://doi.org/10.1007/BF02388590
Mitchell, C.
2003
International Business Ethics. (3rd ed.). Novato, California: World Trade Press
Nash, L. L.
1990
Good intentions aside: A manager's guide to resolving ethical problems. Boston, Mass: Harvard Business School Press
Nicolescu, C., Truică, A. P., Urîtu, D. & Corcodel, Ș. F.
2017
Carta Alba a IMM-urilor din Romania 2016., Consiliului Naţional al Întreprinderilor Private Mici şi Mijlocii din România, București. Retrieved from http://www.aippimm.ro/files/articles_files/57/6521/carta-alba-a-imm-urilor-din-romania-2016.pdf
Rachels, J.
2000
Introducere în etică, București, România: Editura Punct
Starcher, G.
1997
Etichs and Entrepreneurship, An Oximoron? A Transition to a Free Market Economy in Eastern Europe, Paris: European Bahá'í Business Forum. Retrieved from https://bahai-library.com/starcher_ethics_entrepreneurship
Codul Muncii actualizat 2018 (Legea nr. 53/2003). (2018). Retrieved February 14, 2018, from http://www.avocat-dreptul-muncii.eu/codul_muncii_2018.php

SERVICES OFFERED BY THE MEDICINE SUPPLIERS FROM THE PHARMACIST'S POINT OF VIEW

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Abstract

Purpose *- The subject of the paper is the identification of the pharmacist's perception regarding the services and products offered by medicine suppliers. Also, the paper tries to explain the reasons for the constant increase of the pharmaceutical market in Romania, to expose the more efficient ways of promoting medicines and to show the pharmacists' dissatisfaction regarding the supplying of the pharmacies by the storehouses.*

Methodology/approach *- Inquiry based on a questionnaire in order to identify the pharmacist"s perception regarding the services and products offered by medicine suppliers.*

Findings *- The paper wants to define the relation between medicine storehouses and pharmacies.*

Research limitation *– A limited number of questionnaires*

Practical implications *- Theoretical study of the issue and an inventory of the marketing research that I will do.*

Originality/ value *– In the questionnaire, there will be questions referring to the services offered by the suppliers which could be improved, to the time needed for the delivery and the relationship between the suppliers and the pharmacies.*

Key words *- Marketing, Supply of Pharmaceutical Products, Pharmaceutical market*

1. Introduction

The issue of medicine distribution is linked to the way in which the pharmacies are served by the suppliers. In the current context, the distribution is made through distribution channels. On this line, the decisions regarding the choice of a channel of distribution represent one of the most important categories of decisions in the management process. They influence directly all the other marketing decisions.

The aim of each method of distribution is to bring the product from the place of manufacturing to the consumer. This has to arrive in the best conditions in order to satisfy the needs of the consumer from the point of view of quality, acceptable price and easy acquisition

This paper tries to underline the main strong and weak points which characterize the distribution of pharmaceutical products. On this line, certain aspects regarding the pharmacists' discontentment linked to the supply of pharmacies by the storehouses will be underlined. Also, I will show which services are offered by the distributors and appreciated by the pharmacists, as well as those which could be improved.

Not lastly, I want to illustrate the criteria considered by pharmacists to be the most important in the collaboration with the storehouses.

2. The role of pharmaceutical marketing

In contrast with other domains of marketing, the particularity of pharmaceutical marketing is given by the fact that the pharmaceutical industry creates and produces the medicine, which is not a product

like others; this will not be bought freely or by choice of the consumer. The medicine is a special product which must be put in the patient's service, aiming the healing of certain diseases, protecting and improving the patient's health. (Rus, 2010) The act of buying pharmaceutical products is not a free one, it does not belong to the patient, but it is guided by the doctor, so the target market of the medicine is made up by the doctors who prescribe. The incidence of diseases is an important criterion of classification for the identification and qualitative evaluation of the market for a prescribed pharmaceutical product. Thus, the pharmaceutical market does not refer only to medicines, but also to the pharmaceutical services which accompany them and which, as for now, are not paid many times by the social security systems.

The distribution includes the integrality of activities which happen in time and space, from the finishing of the product to its entrance in the final consumption. The aim of each medicine storehouse is to organize itself at its best, based on the law, so that it could offer the pharmacies all the products that these ask for. The role of the distribution is to assure the continuous flow of the products towards the consumers having the following desideratum: the accomplishment of a proper correlation between demand and offer, the displacement of the products to the place of demand, the assurance of the proper moment of supply as reported to demand and the accomplishment of the rational minimum costs. (Jelev, 2006)

3. The results of the inquiry based on questionnaire

The aim of my inquiry was to find out the pharmacists' perception on the services offered by medicine suppliers in Romania, to identify the discontentment linked to the supply of pharmacies by the storehouses, to know which the most important criteria are in a collaboration relationship with the medicine storehouses, to understand the reasons for the increase of pharmaceutical market and to know the pharmacists' opinion referring to the evolution of storehouses.

For this, I made up a questionnaire which I distributed to the pharmacists who work in open circuit pharmacies and in hospital pharmacies. The questionnaire consisted of 14 questions and was filled in by 198 pharmacists.

As far as the collaboration of pharmacies with the medicine storehouses is concerned the majority of the pharmacists declared themselves satisfied and very satisfied.

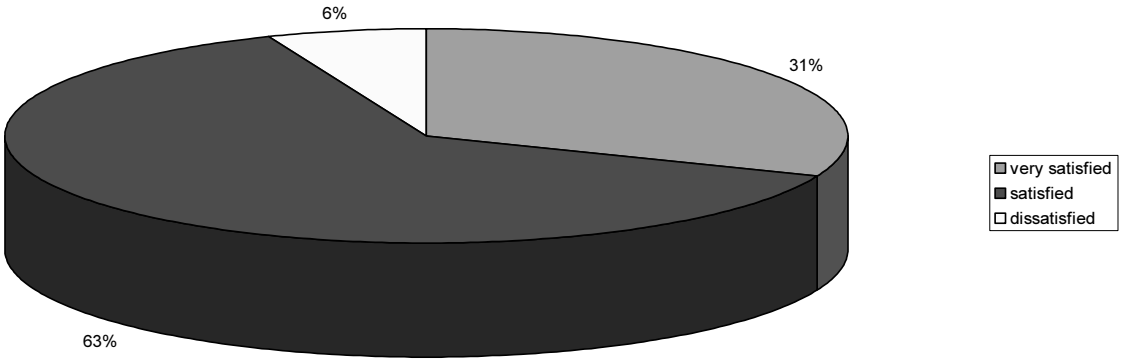

Image 3.1 "Are you satisfied by the collaboration of the pharmacy with the medicine storehouses?"

From the point of view of the services offered by the medicine suppliers which could be improved, most of the questioned pharmacists mentioned the offer of discounts to more medicines, the supplying of the storehouses and the delivery time of the ordered products.

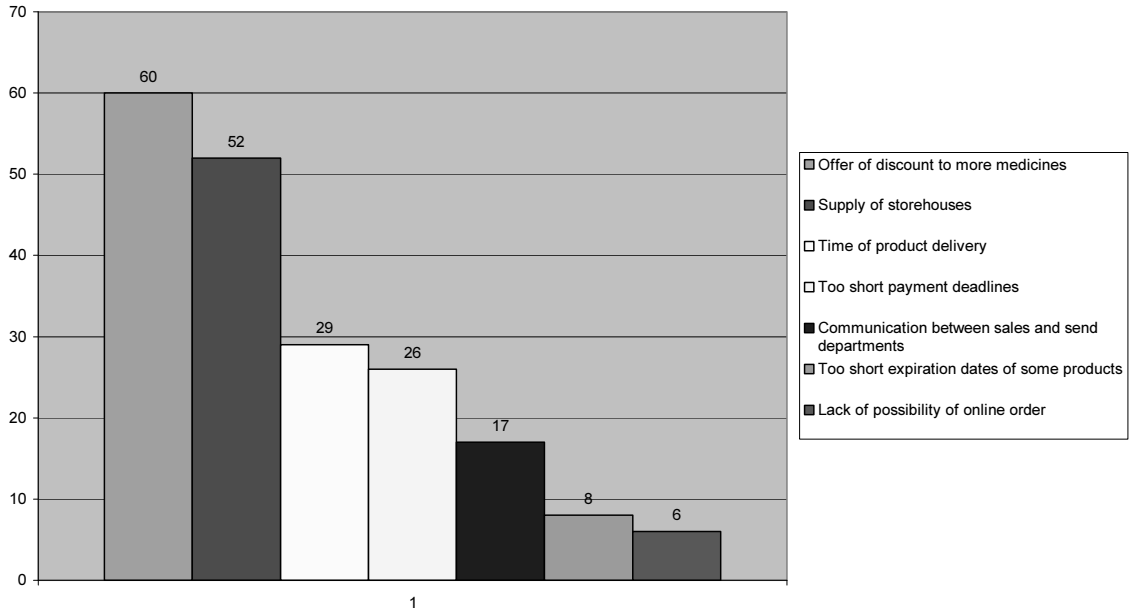

Image 3.2 Whish services offered by the medicine storehouses could be improved?

The majority of the pharmacists indicated that the discounts offered by suppliers are between 5-10%.

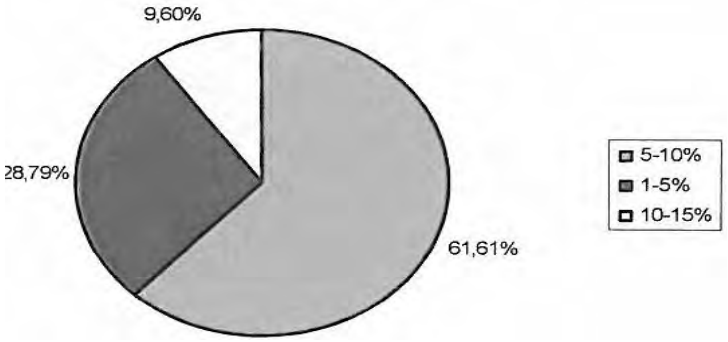

Image 3.3 Discounts offered by medicine suppliers

The payment deadlines asked by the medicine suppliers vary from 60 to 90 days and from 90 to 120 days. Few pharmacists mentioned that the deadlines pass 120 days.

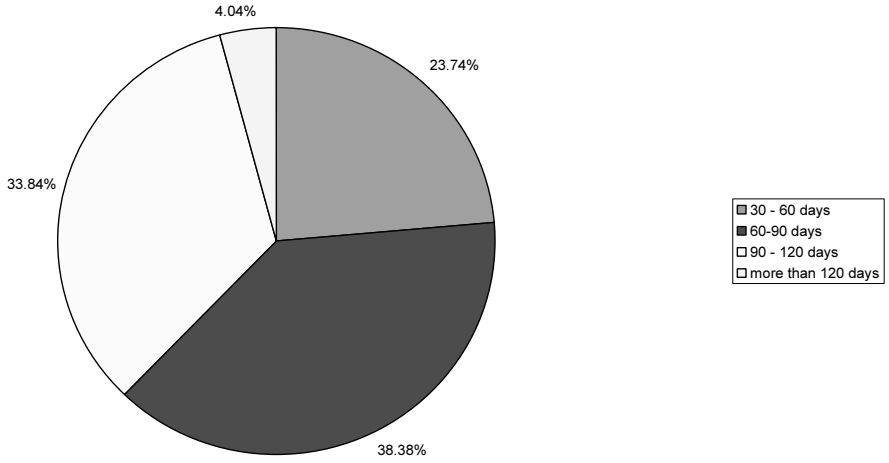

Image 3.4 The payment deadlines asked by the medicine suppliers

Most of the pharmacists consider that the pharmaceutical products arrive in pharmacies in 24 hours or over 24 hours. The time of delivery is very important because the relation between the storehouse with the pharmacy depends on it. For the pharmacy it is an important criterion when it decides to co – work with a certain supplier.

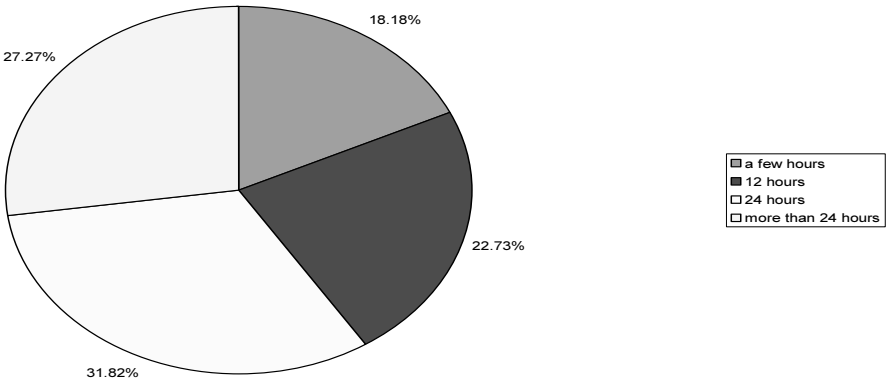

Image 3.5 Time of delivery for the ordered products

Among the pharmacists' dissatisfaction regarding the supply of pharmacies by the storehouses we mention the lack of medicines produced by the supplier but inexistent on the market, defective supply of the medicine storehouses, errors and delay in delivery of the ordered products.

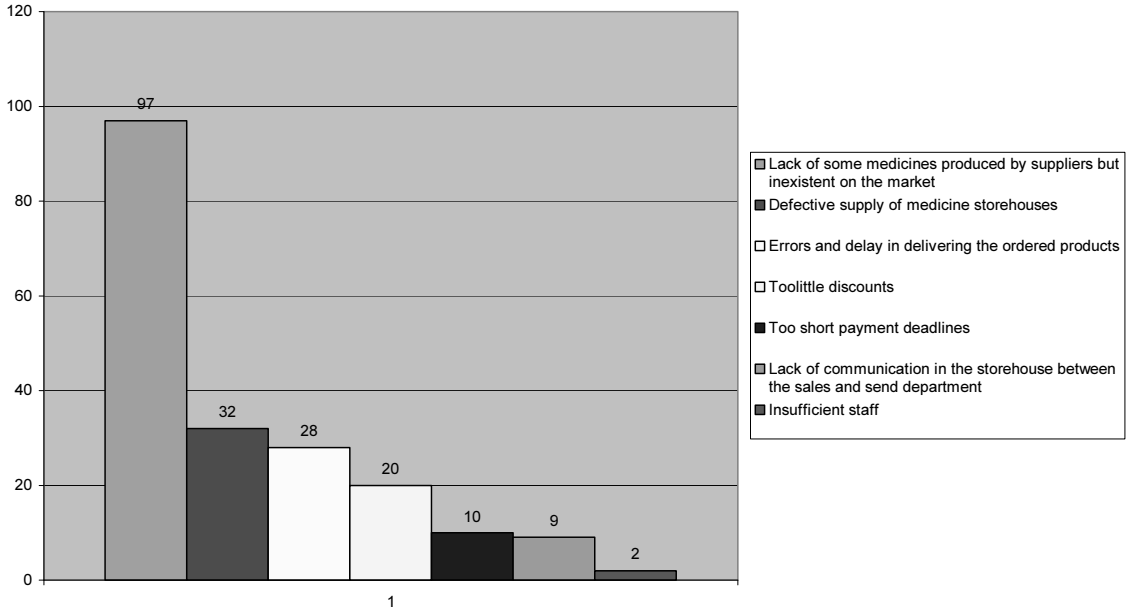

Image 3.6 Pharmacists' dissatisfaction regarding the supply of pharmacies by the storehouses

The most appreciated services given by the medicine suppliers are: promptness in delivering the orders and good co – working between the pharmacies and storehouses.

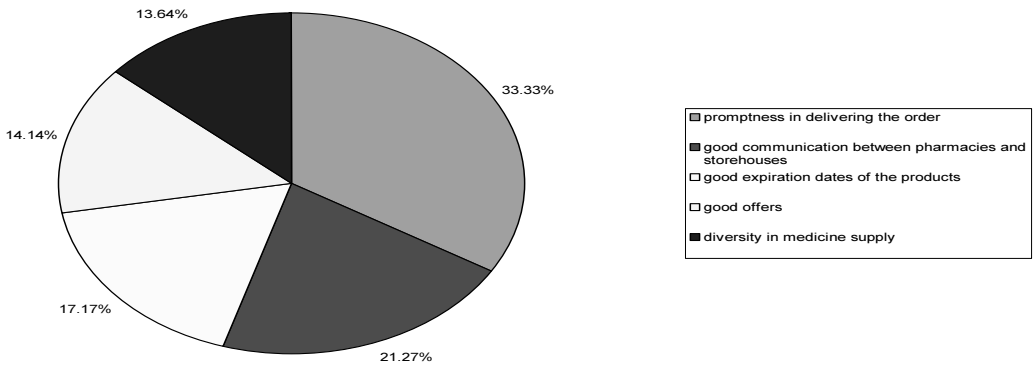

Image 3.7 Services offered by medicine storehouses appreciated by pharmacists

The supply of storehouses and the professional training of the employees in the domain are considered as primordial criteria in the co – working relationship between pharmacists and medicine storehouses. It is observed that the factors strictly linked to business (payment deadlines and discounts) influence less the co – working of the pharmacy with the storehouse.

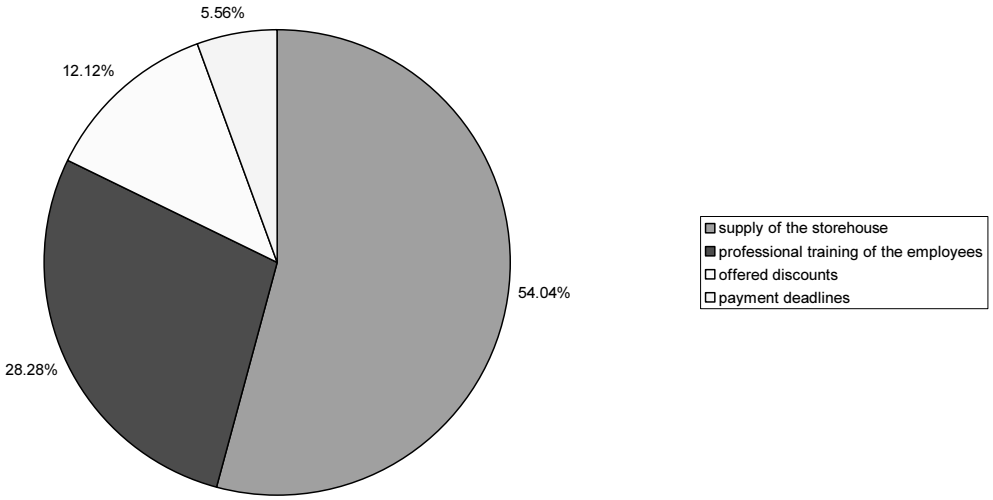

Image 3.8 The most important criteria considered by pharmacists in a co – working relation with medicine storehouses

As far as the evolution of medicine storehouses is concerned, the pharmacists' opinion is that there will be a decrease of the number of suppliers and that the offered services will be of a higher quality.

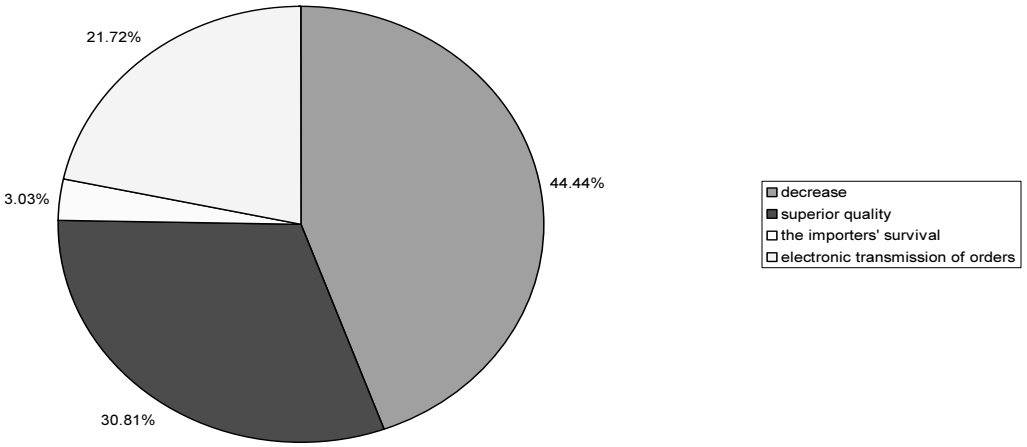

Image 3.9 The evolution of medicine storehouses

Both the presentation of medicines made by specialists in the field (doctors, pharmacists) and the symposiums and conferences represent the most efficient ways of promoting medicines, while advertising and exhibitions at product stands do not have a great impact on those questioned.

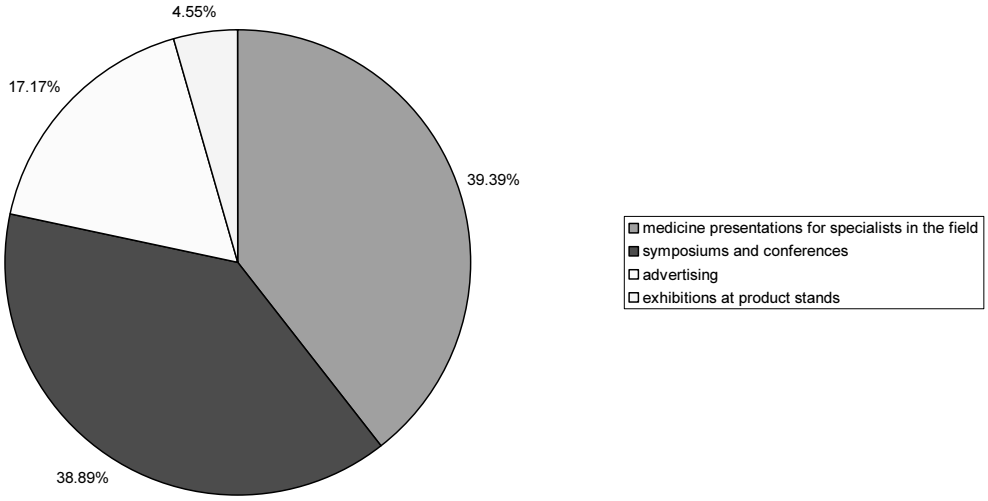

Image 3.10 Ways of more efficient promotion of medicines

The majority of pharmacists who took part in the inquiry consider purposeful the calling of medical agent teams for promoting medicines in pharmacies.

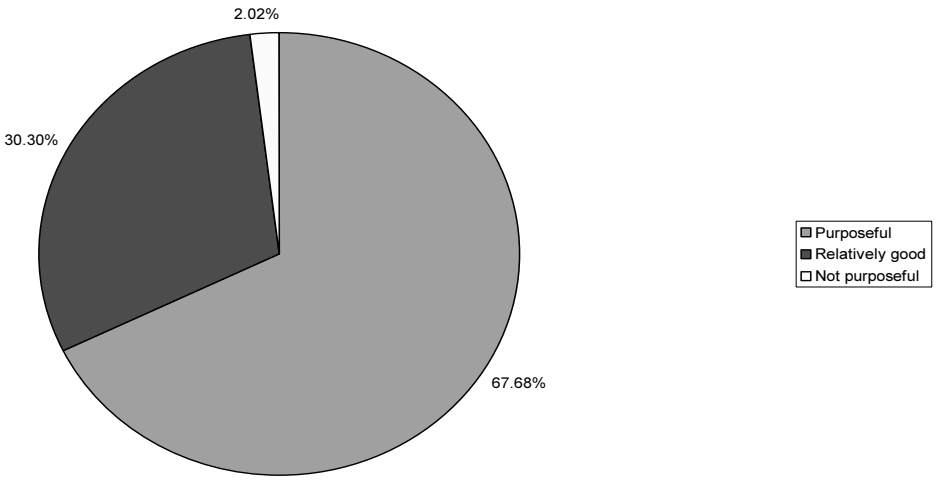

Image 3.11 The purpose of calling medical agent teams for promoting medicines in pharmacies

The doctor who prescribes (personal, specialist or attending) is the one who determines and influences the patient to buy a certain medicine.

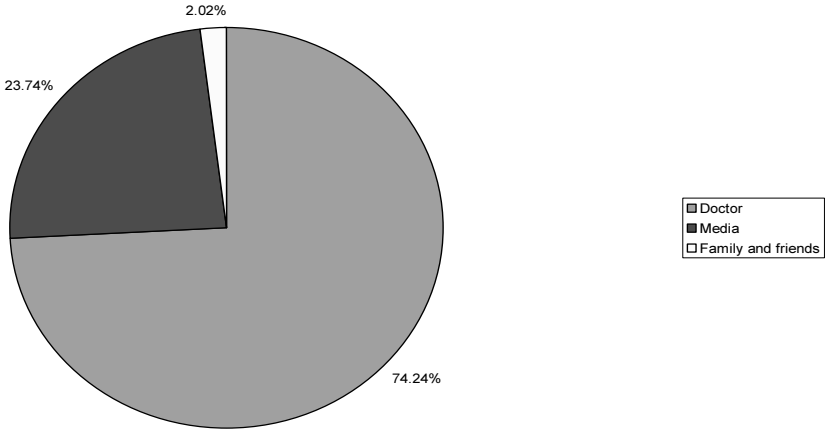

Image 3.12 The aspect that influences consumers (patients) in buying a certain medicine

Another important aspect is that of knowing what the most important thing is for the beneficiary of the medicines. Most pharmacists believe that the most important aspect for patients is that the product to arrive as soon as possible in order to be able to buy it and the price to be as low as possible.

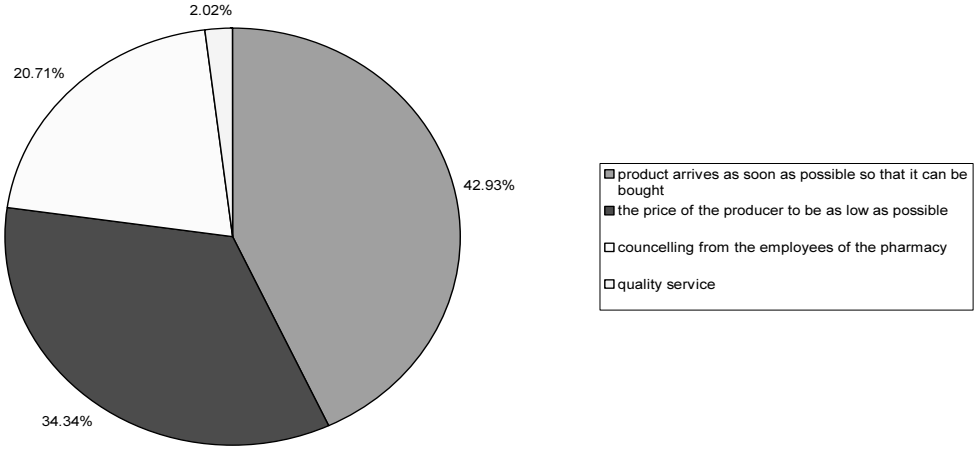

Image 3.13 The most important criterion for the beneficiaries of medicines

The explanation for the constant growth of the pharmaceutical market in Romania is the topic of the last question of the questionnaire. Most of the pharmacists consider that the decisive and responsible agents for the constant growth of pharmaceutical market are given by the increase in the number of illnesses and increase in people's access to medicines.

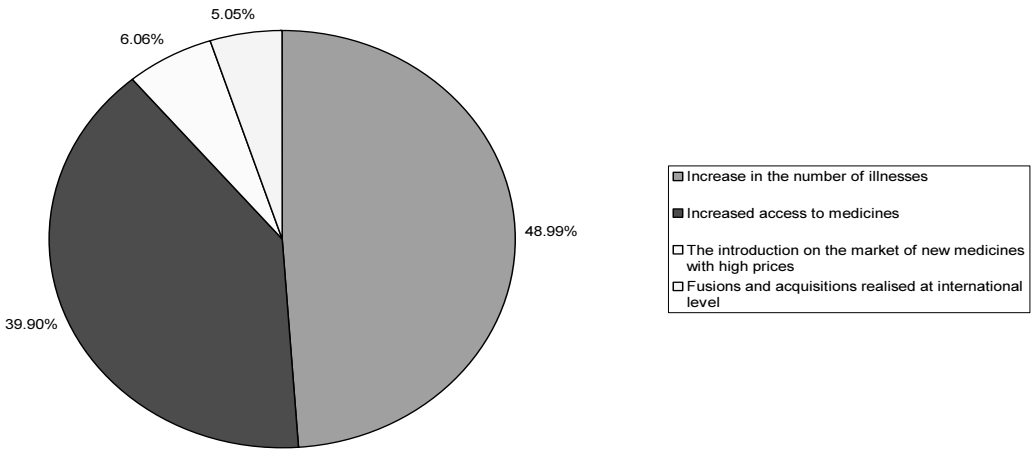

Image 3.14 The explanation to the constant increase of the pharmaceutical market in Romania

4. Conclusions

After centralizing the obtained results of the completed questionnaires the following statistically significant conclusions can be inferred:

1. The medicine market is a dynamic one, having a sustained increase in the last years both because of an increase in the concern for the individual's health and because of the increase in the number of illnesses, which led to an increase of the market in real terms.

2. The offer of discounts to more medicines, supply of storehouses and the time of product delivery represent services offered by storehouses which could be improved.

3. As the evolution of the number of active distributors on the Romanian market proves, which decreased in the last years from 400 to 40-50, most of the pharmacists consider that in the future the decrease in the number of distributors of medicines will continue and that the services will be of a higher quality.

4. From the pharmacist's perspective, the main role in influencing the patient for buying a certain medicine is held by the doctor. For the beneficiaries of medicines the most important aspect is that the product must arrive on time and the price must be as low as possible.

5. In the co – working relationship "storehouse – pharmacy" the most important criterion is represented by the supply of the storehouse

6. The lack of medicines on the pharmaceutical market and the faulty supply of storehouses are considered as one of the pharmacists' main dissatisfactions, while promptness in delivery of the order and a good communication between the pharmacies and storehouses are among the most valuable services.

References

Rus (Groza), E.
2010
The Management of Distribution of Pharmaceutical Products of Human and Veterinary Usage, Summary of PhD Thesis, Universitatea „Babeș-Bolyai", Cluj-Napoca, p.28.
Jelev, V.
2006
International Marketing, Course Notes, Editura Fundației România de Mâine, București, p.119
Diaconescu M.
2005
Marketing, Editura Universitară, București
Brătianu C.
2006
Management and Marketing – Fundamental Concepts, Editura Comunicare.ro. București

INCREASING PERFORMANCE THROUGHT COST MANAGEMENT

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Abstract

Purpose *– In the present study, I proposed to conduct an analysis of the cost behavior and to establish their equation, useful for calculating the sale price and subsequently the profit.*

Methodology/approach *- Cost delimitation: material and wages was established, then the dependent variable and the independent variables were established and a regression analysis was performed.*

Findings *– By regression analysis we confirmed that there is a direct link between the dependent variable and the independent variables and we obtained the cost equation.*

Research limitations/implications *– When data distribution is not normal, regression analysis cannot be used. When data is normally distributed, the analysis is useful and can be extended by delimiting a model able to estimate a cost equation in an enterprise.*

Practical implications *– The analysis can be useful and can be used by companies to estimate costs when we know the company's past data, or when we have a normal distribution of it.*

Originality/value *– This study shows value because it involves studying cost behavior. Because in the economic activity the costs are those that ultimately determine the selling price and afterwards the profit, I consider it important to study them through statistical techniques.*

Key words: *Cost of production; Regression analysis; Cost Management*

Introduction

With the globalization of the economy, firms face growing competition on the market. Each company is trying to have a competitive advantage that allows it to produce more, more specialized or more diversified with the ultimate goal of making the most profit. Thus, the managers in their activity assign a significant share of their time to analyze and find solutions that best correspond to the profit - opportunity - cost - risk relationship (Lucas, 2003). At the base of these efforts, many times, there are often economic and financial problems which often do not answer even when there are strategies, objectives and well-defined operational plans. These problems occur most often due to insufficient information, faulty or delayed processing, distortions or processing errors (Cooper and Kaplan 1988; Shim and Sudit 1995). The source from which economic information starts is accrual accounting that uses a language that is sometimes difficult to reach for managers (Ahrens and Chapman, 2004).

With the passage of time, the effect of change as a result of globalization has also been felt in accounting that has moved from the classical or neutral form of reporting past events to a modern form that monitors, issues, and analyzes, provides additional explanations of developments or tendencies that arise at cost, income, profit, starting from general to particular or vice versa (Covaleski & all, 2003; Ahrens, & Chapman, (2004).) Estimation using specific data processing techniques an important role in the company's activity (planning and control) because for most products (new or under construction) changes in the cost components occur, changes that affect the company's profitability and its long-term survival on the market.

Linear simile regression analysis is a technique used to establish the general link between a dependent variable and independent variables (Cochran, 1976; Zellner, 1970). The advantage of developing a regression technique is that it helps to develop a model that can be used later by

managers to make decisions as a useful solution to a problem in the future (Stockton & Middle, 1986; Stout, 2015). In econometrics, there are many hypotheses and limitations related to the variables used in studies, sometimes due to simultaneous complications that produce major effects, sometimes due to intercorrelations between these variables that are difficult to control (Jensen, 1967; Cochran, 1976).

The purpose of this study is to identify the cost of production equation and to analyze the variation of these costs based on historical data taken from accounting, useful in forecasting and budgeting. The analysis assumed the link between the variables considered dependent and independent by statistical indicators: probability, variance and correlation. Using multivariate regression analysis the predictive and observed values, residual values and distances of Mahalanobis and Cook were studied.

Material and method

In this study an analysis was made of the behavior of the production costs identified in wage and material costs versus the quantity obtained. Subsequently a statistical analysis was performed using regression analysis by delimiting the existing variables in dependent and independent variables to see if there is a link between the variables taken in the study, the shape and intensity of the binding and the establishment of the regression equation.

Table 1. Annual baseline

Month	Quantity produced	Total production costs	Wage costs	Material costs
January	2.270,00	320.000,00	153200	166800
February	2.400,00	335.000,00	161200	173800
March	2.520,00	350.000,00	164300	185700
April	2.800,00	385.000,00	154400	230600
May	2.850,00	390.000,00	165300	224700
June	2.920,00	400.000,00	181200	218800
July	2.650,00	360.000,00	165300	194700
August	2.400,00	325.000,00	135400	189600
September	3.200,00	430.000,00	171200	258800
October	3.350,00	450.000,00	175200	274800
November	3.110,00	420.000,00	169400	250600
December	2.720,00	375.000,00	162300	212700
Total	33.190	4.540.000	1.958.400	2.581.600

The regression analysis was performed using the Statistical Program (v. Soft, USA) using the data presented in Table 1.

Regression analysis was used because it is a statistical technique that uses the data to estimate the intercept and slope of a cost equation (production cost demarcation line) and to establish the link between the variables (dependence and independence). For this, the dependent variable (y) was considered to be Material costs and the independent variable (x) the Quantity, Wage salaries and Total cost production (produced for the twelve months) taken into the study.

The regression model can be represented in terms of a matrix [Weisberg, 1985], according to Eq. (1):

$$y = x\alpha + e \quad (1)$$

Where: y - the material cost (dependent variable), where $y = [y_1, ..., y_n]^T$; x - the quantity produced for the twelve months taken into study, Wage salaries and Total cost production (independent variable); e - the variable interpreted as an error (perturbation or measurement error), where $e = [e_1, ..., e_n]^T$; α - the vector of the coefficients px1 parameters of the model, where $\alpha = [\alpha_1, ..., \alpha_n]^T$.

If the model is appropriate then the observed value y_i can be determined by the value x_i. The model assumes that errors are normally and independently distributed by zero and s^2, Eq. (2).

$$s^2 = \frac{\sum_{i=1}(y_i - \hat{y}_i)^2}{n-p} \quad (2)$$

Where: ẏ - the value adjusted by the regression equation; n - number of observations; p - number of estimates.

Using the observed responses and predictors, unknown parameters are estimated.

In the regression analysis the following statistical indicators were calculated: R-square, P-value, standard error, ANOVA variance analysis, and then the distance Mahalanobis and the distance Cook.

R-square was calculated because it represents a possibility of statistically measuring the way in which the regression line matches the data [Comiskey, 1966]. Specifically, it measures the percentage of the independent variable variance (Total production cost, Wage salaries and Quantity) that varies and is explained by the dependent variable (Material costs). When R-square takes values close to 0, we say that there is no linear relationship between the cost of production and quantity, and when the values are close to 1, we say that there is a perfect linear relationship between the cost of production and the quantity.

The p value is for the intercept and slope and measures the probability of observing high values, as well as the estimated B coefficient when the real value is zero.

In the regression analysis, the term "standard error" was used to compute the standard regression error, i.e. to show the usual least square estimate of the standard deviation of the underlying errors. It is considered that the data-driven line by regression is the best right line to the data. Depending on the regression coefficient, the relation type (direct correlation - positive value, and inverse correlation - negative value, when B = 0, we say that variables (y and x) are independent).

Later, a correlation method has been used which has the advantage of providing a synthetic measure of the links between the statistical variables. The indicators that measure the intensity of the link are: covariance, correlation coefficient and correlation ratio. Covariation is calculated as the simple arithmetic average of the products of the deviations of the two correlated variables, x and y, from their arithmetic meanings x and y, according to Eq. (3):

$$Cov(x, y) = 1/n \sum i=1 la\ n\ (xi - \dot{x})\ (yi - \dot{y}) \quad (3)$$

Covariation are null if variables are independent (lack of correlation bond). Its absolute value cov (x, y) has no upper limit. As the correlation intensifies and the covariance increases. The indicator has the advantage that it is fairly easy to calculate and the disadvantage that it depends on the units in which the random variables are measured. So it is not comparable from one variable to another; high values of the indicator show a strong link.

The correlation coefficient can take values between -1 and +1, ie it satisfies the inequalities: $-1 \leq ryx \leq 1$, and its sign, as well as the regression coefficient, signifies the type of linkage ("-" reverse link, "+ "Direct link"). The more the correlation coefficient has values closer to 1 or -1, the correlation between the x and y variables is stronger, and when approaching zero, the intensity of the link between the two variables decreases. If rx = 0, the variables are linear or uncorrelated variables, and for equation with the unit, the functional dependence between the two variables results.

In order to perform the regression analysis Eq. (4):

$$\text{Total production cost} = \text{Wage costs} + \text{Material costs} \quad (4)$$

The estimated linear model of the procedure is presented by Eq. (5):

$$Y = \alpha_0 X_0 + \alpha_1 X_1 + \alpha_2 X_2 + \ldots + \alpha_{p-1} X_{p-1} + \varepsilon, \quad (5)$$

This model expresses that the variable Y can be obtained as a linear combination of the variables X_0, X_1, ..., X_{p-1} to which the error "ε" is added. The coefficients of regression summary (B) are: $\alpha_1 \ldots \alpha_{p-1}$.

Mahalanobis distance is a statistical way of measuring the distance between a point P and a distribution D, being a multidimensional generalization for measuring the standard deviation distance P from the mean of D. This distance is zero if P is in the middle of D and increases as P moves away from the mean: the main axis of the component, measures the number of standard deviations from P to the average of D. The Mahalanobis distance is unique and invariant in scale and takes into account the correlations of the dataset.

Cook's distance is an estimate used in statistics in regression analysis. From a practical point of view, Cook's distance was used to indicate influential data points worth considering for validation, or to indicate areas where the initial data that led to those results should be studied more carefully.

Results and discussions

After analyzing the evolution of the quantity and the production costs over the 12 months, Figures 1-3 were obtained.

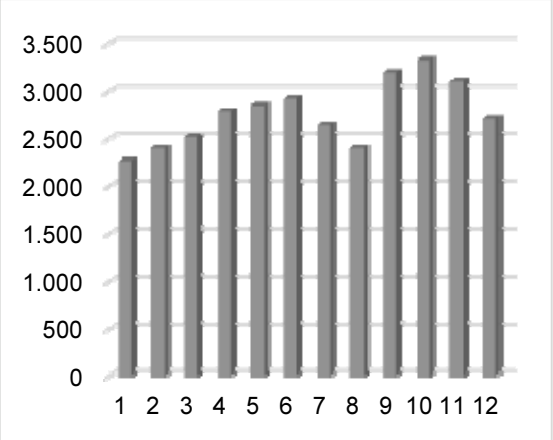

Figure 1. Distribution of the quantity produced during a calendar year

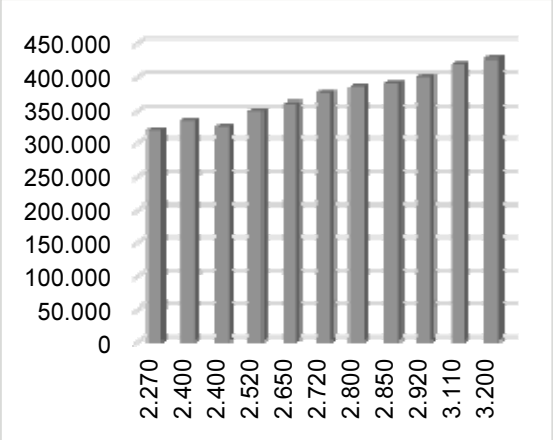

Figure 2. Distribution of total production cost over a calendar year

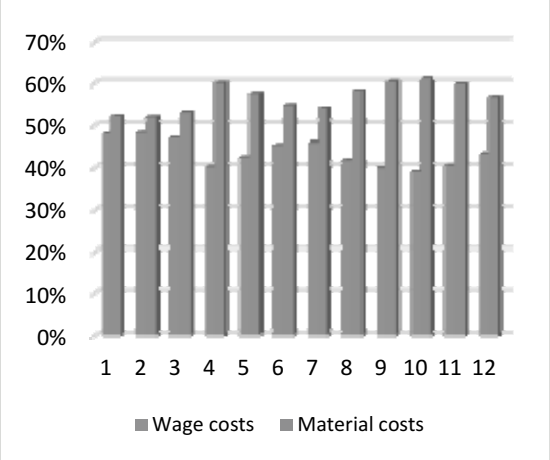

Figure 3. Distribution of wage and material costs over a calendar year

In Figure 1 it can be noticed that the lowest quantity produced is obtained in January and August and the highest in October and September.

In figure 2 it is observed that from the analysis of total production cost according to quantity produced we have the smallest quantity (2270 pieces) obtained in January and the highest (3200 pieces) obtained in October.

In figure 3 it can be noticed that the largest share is held by the material expenses followed by the salary expenditures. Also, we can see that in October we have the lowest level of wage costs (39%) and the highest level of material costs (61%). This situation is due to the highest production level (3350 pieces).

Following the statistical analysis using the multiple regression analysis, the following values were obtained in Table 2, considering the dependent variable, the material costs.

Table 2. Summary statistics

Statistic	Value
Multiple R	1.00
Multiple R^2	1.00
Adjusted R^2	1.00
F(3,8)	$5.73e^{+15}$
p	0.00
Std.Err. of Estimate	$8.71e^{-04}$

From the analysis of Table 2 we can see that the calculations resulted in R2 for 1 which represents a high value close to value 1. This value shows that there is a strong linear relationship between the dependent variable and independent variables (direct link).

Following the calculations using the ANOVA variance analysis, the values given in Table 3 were obtained.

Table 3. Analysis of variance

Effect	Sums of squares	df	Mean squares	F	p-level
Regress.	$1.31e^{+10}$	3	$4.35e^{+09}$	$5.736e^{+15}$	0.00
Residual	$6.07e^{-06}$	8	$7.59e^{-07}$		
Total	$1.31e^{+10}$				

Table 4 presents the values of the statistical indicators obtained for the “Material costs” dependency and the "Quantity", “Total production costs” and “Wage costs” independence.

Table 4. Regression summary for dependent variable (Material costs)

N=12	Beta	Std.Err.	B	Std.Err.	t(8)	p-level
Intercept			$1.45e^{-09}$	$3.92e^{-03}$	0	1,00
Quantity	$1.28e^{-13}$	$1.15e^{-07}$	$1.30e^{-11}$	$1.16e^{-05}$	0	0,99
Total production costs	1,22	$1.20e^{-07}$	1.00	$9.86e^{-08}$	10,144,231	0,00
Wage costs	-0,34	$1.33e^{-08}$	-1.00	$3.88e^{-08}$	-25,764,996	0,00

As a result of the regression analysis (Table 4) it is observed that the coefficients B necessary for determining the regression equation (obtaining the equation for determining the material cost) are: the coefficient for the free term ($1.45e^{-9}$), then for the quantity ($1.30e^{-11}$), total production costs (1) and wage costs (-1). Regression line intercepts are interpreted as the variables taken into the study that allow the calculation of coefficients related to independent variables. The result of the regression is given by the intercept ($1.45e^{-9}$), i.e. the free term, while the coefficients of the independent variables allow the slope of the regression line to be set. In other words, there is a probability that even if the first coefficient (free term) is zero, we can see an estimate of up to $1.45e^{-9}$. In the present case, this probability is very low.

Table 5 shows the current status of sweep matrix for dependent variable.

Table 5. Current Status of Sweep Matrix; DV: Material costs

Effect	Quantity	Total production costs	Wage costs	Material costs
Quantity	-227,12	236,96	-14,53	$1,28e^{-13}$
Total production costs	236,96	-249,34	16,7	1,22
Wage costs	-14,53	16,7	-3,05	-0,34
Material costs	$1,28e^{-13}$	1,22	-0,34	$4,65e^{-16}$

The calculations resulted in the regression line indicating that the production cost equation can be written as the following relationship:

$$\text{Material costs} = 1.45e^{-9} + 1.30e^{-11}\ Q + \text{Total production costs} - \text{Wage costs}$$

Table 6 shows the regression residuals.

Table 6. Predicted and residual values for dependent variable: Material costs

Case no.	Observed value	Predicted value	Residual	Standard pred. val.	Standard residual	Std.Err. pred. val.	Mahalanobis distance	Deleted residual	Cook's distance
1	166800,0	166800,0	0,00	-1,40298	0,00	0,000519	2,993015	0,00	0,00
2	173800,0	173800,0	0,00	-1,19979	0,00	0,000434	1,810334	0,00	0,00
3	185700,0	185700,0	0,00	-0,85437	0,00	0,000384	1,223648	0,00	0,00
4	230600,0	230600,0	0,00	0,44895	0,00	0,000609	4,463023	0,00	0,00
5	224700,0	224700,0	0,00	0,27769	0,00	0,000288	0,285792	0,00	0,00
6	218800,0	218800,0	0,00	0,10643	0,00	0,000527	3,107936	0,00	0,00
7	194700,0	194700,0	0,00	-0,59312	0,00	0,000598	4,263207	0,00	0,00
8	189600,0	189600,0	0,00	-0,74116	0,00	0,000785	8,018147	0,00	0,00
9	258800,0	258800,0	0,00	1,26752	0,00	0,000446	1,967569	0,00	0,00
10	274800,0	274800,0	0,00	1,73195	0,00	0,000521	3,018279	0,00	0,00
11	250600,0	250600,0	0,00	1,02950	0,00	0,000373	1,101328	0,00	0,00
12	212700,0	212700,0	0,00	-0,07063	0,00	0,000339	0,747724	0,00	0,00
Minimum	166800,0	166800,0	0,00	-1,40298	0,00	0,000288	0,285792	0,00	0,00
Maximum	274800,0	274800,0	0,00	1,73195	0,00	0,000785	8,018147	0,00	0,00
Mean	215133,3	215133,3	0,00	0,00000	0,00	0,000485	2,750000	0,00	0,00
Median	215750,0	215750,0	0,00	0,01790	0,00	0,000483	2,480292	0,00	0,00

Residual regression analysis (Table 6) allows to identify the differences recorded during the year, presenting the values observed against the estimated ones and calculating the volume of activity: minimum, maximum and average. From the analysis of Table 6 it can be seen that in the Material costs (DV), according to Mahalanobis distance, the highest value is recorded in August, which show that these month there is the highest number of standard deviations (P) from the average (D), that is, it moves away from the average. It is observed that the residue of an observed value was obtained as the difference between the observed value and the predicted value. The smallest positive residue (according to Mahalanobis distance) is in May and the highest in August. Negative residues tell us that in those months the observed values are lower than predicted values.

Analysing Table 6 we can see that at the residuals of Material costs according to Cook's distance is not identified.

Conclusions

The regression analysis allowed the determination of the Material production cost equation, the relationship between the “Material costs” (dependent variable) and the independent variable "Quantity", “Total production costs” and “Wage costs” which is useful in cost management as a result of the relationship of linear dependence between them. According to the example taken in the study, for linear distribution, linear regression analysis can establish the type of link between variables using

existing data in the company's accounting. Thus, starting from the Material costs, we can establish the optimum production level knowing minimum, maximum and average information.

Subsequently, the residue regression analysis allowed the identification of the differences recorded during the year, presenting the values observed against the estimated ones, which is useful for analyzing the changes in the volume of activity with direct implications in the production cost (high unit costs when we have residual values big). The analysis of the residue in the volume of activity through regression analysis is useful because it then allows the managers to identify the causes that caused those changes (these can be both technical and economical).

References

Cook D.,
1977
"Detection of influential observation in linear regression", Technometrics, 19 (1): 15-18.
Comiskey E.,
1966
"Cost control by regression analysis", The accounting rewiev, p. 235-238.
Cochran E.B.,
1976
"Using regression techniques in cost analysis", part 2, Int. J. Prod. Res., 14 (4): 489-511.
Covaleski, M.A., Dirsmith M.W. and Samuel S.,
2003
"Changes in the institutional environment and the institutions of governance: extending the contributions of transaction cost economics within the management control literature", Accounting, Organizations and Society, 28 (5): 417-441.
Ahrens, T. and Chapman C.S.,
2004
"Accounting for flexibility and efficiency: a field study of management control systems in a restaurant chain", Contemporary Accounting Research, 21 (2): 271-301.
Stockton, D.J., Middle J.E.,
1982
"An approach to improving the cost estimating", Int. J. Prod. Res., 20 (6): 741-751.
Cooper, R. and R. Kaplan.
1988
"How cost accounting distorts product costs", Management Accounting, 69 (4): 20–28.
Shim, E. and E.F. Sudit,
1995
"How manufacturers price products", Management Accounting, 76 (2): 37–39.
Lucas, M. R.,
2003
"Pricing decisions and the neoclassical theory of the firm", Management Accounting, 14: 201–207.
Korok R. and J. Gramlic,
2016
"Reconciling Full-Cost and Marginal-Cost Pricing", Journal of Management Accounting Research, Spring 28 (1): 27–37.
Weisberg, S.
1985
"Applied linear regression", Wiley, New York.
Stout D.E.,
2015
"Regression analysis: Instructional resource for cost/managerial accounting", Accounting Education: An International Journal, 24 (1): 57–73.
Zellner A.,
1970
"Estimation of regression relationships containing unobservable independent variables", International economic review, 11 (3): 441-454.
Jensen R.E.,
1967
"A multiple regression model for cost control - assumptions and limitations", The accounting review, p. 265-273.

MANAGEMENT AND INSURANCE OF THE THERAPEUTIC SYSTEMS IN SHELTERS FOR THE PREVENTION OF VIOLENCE IN THE STATE OF ISRAEL

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Abstract

Purpose *– To develop the individual organizational concept, to empower the individual within the organization in order to improve the relationship within and outside the centers by referring to the authorized bodies (system).*

Methodology - *The research question - How do care managers help women who have experienced violence to incorporate them back into society?*

Iused Materials methods of research, In this paper, the authors review a higher education of Israel and its contemporary problems, using scientific journals in the field and nrwspapers.

Findings - *Empowerment means helping rebuild a sense of self-efficacy. This empowerment transfers the battered woman from a state of helplessness to a state of control.*

Research limitations – *limitation in this research, some abused women in shelters do not agree to be connected to the research or to interview**.***

Originality - *To create an influence on the organizational structure and the way how the shelters provide the services to abused women in there live period in shelters.*

Key words – *managed, women, shelter.*

Introduction

As an educator, I felt a sense of self-commitment towards my students, It is my duty to give them a proper education for the phenomenon of violence spreading throughout the world. This phenomenon goes on the timeline, It does not stop, Moreover ,every day we witness a violent case in society, Whether in the Arab sector or in the Jewish sector.

Violence must be uprooted from its roots, So I want to manage and suggest ways to help care centers, Such as shelter. Where the victims live for at least six months after experiencing the violence on their day-to-day basis.In the organizational management of these systems. It is interesting to note how the management culture in each of these centers is carried out, It should be noted that in the "how" investigation, we will achieve that the management of these organizations will have to believe in all the victims under its wings.

It is shocking to me to hear or read about a violent case women have come across, This phenomenon is a huge and familiar phenomenon. It is therefore necessary to develop management methods in organizations that deal with victims of violence. The tools they acquire from the organizations that care for them will help them change their lives and give them another chance, So I came to the conclusion that I would investigate this phenomenon and the ways in which these organizations are managed.

Violence is defined as behavior that harms others, The attack can be physical or psychological [“Horowitz (2000)”]. In the professional literature dealing with violence, two alternative concepts are used to study the phenomenon, aggression, violence. At the center of the concept of aggression lies the individual, and at the center of the concept of violence is society. Aggression is deliberate behavior, whereas violence is a social phenomenon that has a protracted phenomenon and can involve more than one person [“Horowitz(2000)”].

Domestic violence is abusive behavior aimed at controlling, the offender attempts to control the injured in different ways. The violence of men in the family is based on the assumption that the holder of power is also the holder of control and he has the right to apply it through various forms of coercion. Unfortunately, there are also women who still believe that the husband has the authority and the right to force their authority by strength [“Ministry of Education and Culture, the Day of International Struggle against Violence against women”].

Therefore, it is the responsibility of the state to find effective solutions for this circle. One of the solutions offered by the state is a shelter that can be used by Women who experience violence and women who are at very high risk of harm by their husbands. As soon as a woman complains to the police that she is at risk and a real threat to her life, she is turned to the shelter [“Hoch, Black Angelman (2010)”].

Rationale

I would like to explore the management and insurance methods of shelters and prevention of violence in the State of Israel. The impact of safety management on their daily lives whether it is during their stay in shelters or whether after leaving these organizations The impetus that led me to this study is the increase in the percentage of women who apply to these organizations in search of effective insurance managed by these organizations. I would like to explore the management and insurance of shelters for the prevention of violence and find out if these organizations provide the right management and insurance for the victims of violence, or that the percentage of immigration is only a phenomenon of the escape of victims to a management organization far from the field of violence.

Review of the Literature

Violence against women: Violence against women is an existing phenomenon and is more common than what one would want to admit. Among couples, it is often characterized by abuse for many years. Violence is not only interpreted as physical violence, but also as an economic and sexual control of the man and often also of the other occupants of the house [“Gal (2003) ”]. The lives of women victims of violence are compounded by emotional and physical pain that has persisted many times in their lives, sometimes since they were little girls [“Naor (2008) ’]. The phenomenon of domestic violence against women is not new, but the research, public and political awareness of the subject began to emerge around the world only in the early 1970s, thanks to the activity of moral and immoral women's organizations, which assessed the phenomenon as a social problem [“Avni (1991) ”].

The shelter systems organizations were intended to receive women for an extended period of several months. The Organization of the first and most famous asylum Organization was founded in London in 1972 by Erin Fizzy. It was intended to serve as a social meeting organization (such as those of our centers today in Israel), but soon became filled with women who fled from their violent partner. Over the past four years, the organization has housed more than 5500 women and paved the way for the establishment of a long list of similar organizations in 1977. The organization means a social structure in which people act as a group for a common goal [“Hebrew-Hebrew dictionary, Milog”]. The organization is also a sub-society, a human society that works to achieve a common goal [“organizations, Yitzhak Samuel (1996) ”].

We see that the idea of establishing shelter organizations in Israel is the fruit of a group of feminist women, and the organizations that support these organizations are of a feminist nature, such as Women for Women, Isha L'Isha and Women Against Violence. And only after the idea emerged and became a social problem did the government organization, the Ministry of Labor and Welfare agree to cooperate and take part in the responsibility for itself and to fund these organizations.

The organization of the shelters was established in the 1970s. The first organization was established in Haifa. Today there are 14 shelter organizations throughout the country. The organization of the shelter was initially designed for an emergency response that provides protected shelter for the abused women. What has distinguished these organizations is that they are high-performing and are the quality of decision-making in their right form and their implementation, more effective organizations score high in strategic decision making, and high-performing organizations are able to make "good" decisions and implement them quickly (Rogier, 2006) In addition, it develops the reality of empowerment, helping to rebuild self-esteem and self-efficacy, enabling it to move from a state of helplessness and passivity to a situation of more perceived control over life [“Yael Saka Gorlad kramer (2013)”].

The short months in the shelter are the beginning of a woman's wondrous romance with herself. This short period is sometimes the gateway to a long-term treatment process. This process requires the woman to perform deep and courageous work, but also rewards her and gives her many strengths [“Naor (2008)”].

Discussion and conclusions

The planning of the therapeutic organizations must undergo the process of preparing decision-making systems for future action based on systematic study and reflection [“Prof. Y. Dror (1978)”]. Planning characteristics, There must be a process of dynamic and flexible activity, because this flexibility will achieve the desired goal, the planning links the desire to the execution, the execution requires staff work and teamwork, while full cooperation in this organization requires mutual fertilization between a variety of areas of activity and organizational functions, Execution, [“ Dudi Shalom (2000)”].

A significant change that must be realized in recent years is that the shelter's economic dependence as it is more dependent than it was at the beginning of the establishment of shelters, which creates an influence on the organizational structure and the way how the shelters provide the services [“Dubash and Dubash (1992)”].

[“Srinivasan and Davis (1991)”] agree with Dubash & Dubash that there is an influence on the organizational structure and the services that are provided in the shelters.Although the shelters have become more bureaucratic and professional, most of them continue to define their guiding philosophy as empowering women [“Srinivasan and Davis (1991)”].

Women's organizations that originally managed the shelters were usually managed as "collectives", whether in terms of division of labor, or in the distribution of responsibilities and rewards, such as wages (if any).

The women who were found in the shelters or in the day care center were not considered to be sheltering in them, but were partners. The intention was to accept their assistance after they were strengthened, as functionaries, or at least as an auxiliary force in organizing and managing of the shelter. In a study that examined the extent to which services in Israel helped to solve the problem of violence, there was found that various services, including 12 shelters, contributed to the improvement of the coping way of women with situation of violence. These shelters helped to familiarize themselves with the possible steps in these situations. Providing of these services there is an improvement in the mental situation of women who were in the shelter and they even helped to stop the violence against them [“Izikovich and Fishman (2001)”].

Empowerment means helping rebuild a sense of self-efficacy, This goal is a therapeutic goal and is aimed at empowering women [“Strak (2007)”]. This empowerment transfers the battered woman from a state of helplessness to a state of control.

The personal empowerment of the battered woman is defined as a process of strengthening personal, interpersonal and political power so that individuals can act to change their situation, according to a more detailed definition Empowerment is a transition from helplessness to control of life, destiny, and the environment. [“Johnson and Yanaca (2007)”].

According to the women who experienced the stay in a shelter in Israel, it was usually perceived positively [“Rabinovich (2003)”]. In other studies with [“Garza in (2002) and Dostler and Nelson in(

2003)"], they concluded that after leaving the shelter, women left with a marked improvement in their self-image.

In Avni's study in 1987 and in Agnew's study in 1998, they also said that battered women reported on the assessment of the shelter staff as well as on the shelter as an organization and the opportunity they had given them.

Interviews with abused women from shelters, each in private and without the names of the interview and the questionnaire, will be anonymous, in order to maintain confidentiality,From the interview with abused women one she said about her husband he look like octopusSending his arms everywhere he is a Octopus chokes. He was threatening to kill me The woman said that her partner had lived in a violent atmosphere in his childhood so he is violent because he watched a violent model, Or that he was a victim of the phenomenon of violence. ["edd (1981)"].

Another woman from the shelter said:

Here I have learned a lot from the staff. They always take care of our feelings, We also meet with the social worker once a week and she always asks what happens to us and how we feel.

They taught us that women should always be strong and each of us strengthens the other.

The staff always employed us, and after the children went to sleep, there was silence then the staff start to talking to us about things that disturbed us or interfered with us during the day, which made us feel good and easy, so we went to sleep and on the second morning we woke up like a new and fresh person.["yael saka (2005)"].

From this interview we are Witnesses that the staff all the time Worry about the abused womens, this victim said, we Feel a member in this shelter not a victim, this management give us to feel the empowerment in our Bodies and we have control of own life.

References

Agnew, v.
1998
"In search of a safe place, Abused women and culturally sensitive service", Toronto, Canada, University of Toronto Press.
Avni.
1987
"Battered women, dynamics of exchange through symbolic interaction". Work for the degree of Doctor of Philosophy, Tel Aviv University, Tel Aviv University.
Avni, N.
1991
"Abused women: The Phenomenon and Its Origins." Delinquency and Social Deviance, 18-29.
Dobash,R.P, and Dobash,R.E, Wilson,M., and Daly ,M
1992
"The myth of sexual symmetry in marital violence". Social Problems, 39: 401-421.
Dostaler . T., and Nelson, G
2003
"Process of outcome evaluation for homeless young womem", Canadian Journal of Community Mental Health, 2: 199- 112.
Eicikovitch, Tz., and Fishman, G
2011
"Research of evaluation of the satisfaction of women from the treatment of domestic violence", Haif, The University of Haifa, Ministry of Labor and Social Affairs.
Edd.
1981
"The Influence of Labeling in the Process of Self-Creation Delinquency and Social Deviance."
Gal, N.
2003
"Violence against women, Shot or aberration?" Ashkelon Academic College.

Garza, M. A.
2002
“Evaluation of a battered Women’s shelter”, Outcomes to measure effectiveness, Unpublished doctoral dissertation, Johns Hopkins University. Baltimore Maryland.
Harmel, Y. Jahnson and Tz. Glick
2007
“The phenomenon of violence – characteristics and therapeutic responses in Israel”, Medicine and low, 26: 106- 115.
Hebrew-Hebrew dictionary.
Milog
Hoch, black.
2010
"Shelters for abused women- solution – worthy. www.get-heskem.com/151536/
Horowitz, A.
2000
“Violence as an anti-social phenomenon - theory and practice.” Jerusalem, Henrietta Szold Institute.
Ministry of Education, Culture and Sport.
Retrieved in 17.3.16
“The International Day of Struggle against Violence Women.”
http://cms.education.gov.il/educationcums/units/shivion/odot
Naor, Y.
2008
"Dialogue with the Body.” moments of grace in a shelter for women victims of violence. Makabetz, The Israeli Journal of Group Therapy, Vol: 13, Issue 2, Winter 2008.
Rabinowitz, T.
2003
“Bride and determined.” Tel Aviv, The Workers' Library.
Rogers, p., and M . Blenko
2006
“Who Has the D? How Clear Decision Roles Enhance Organizational Performance .” Harvard Business Review, 84(1): 53-61.
Srinivasan, M., and L. V. Davis
1991
“A Shelter: An Organaization Like Any Other?” Affilia, 6: 35- 57.
Saka, Y., and Cromer, G.
2005
"Eliya and Kutz Baba": The effect of the stay in the shelter on the self-perception of battered women, Delinquency and Social Deviance, Ramat Gan, Bar-Ilan.
Saka,Y., and Gerald, K.
2013
"The Effect of Being in the Shelter on the Self-Concept of abused women."
www.gendersit.org.il/2013/11/27
Strak, E.
2007
“Coercive control: How men entrap women in personal life” NY, Oxford University Press.
Yitzhak Samuel.
1996
“Organizations.” Haifa university.
Dror, Y.
1978
“policy.” tel –aviv, organization of library.

PERFORMANCE MANAGEMENT OR MANAGEMENT PERFORMANCE AT THE CHAMBER OF COMMERCE IN MURES COUNTY

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Abstract

Purpose *– The purpose of this paper is to present the way the Chamber of Commerce can enhance the opportunities for development in order to become a stronger partner for the local economic community, by clarifying the way it takes into consideration its performance.*

Methodology/approach *- The research methodology is based on theoretical and applied research. By comparison with other types of management in the NGO, we outlined the differences that makes the Chamber of Commerce a unique organisation. In order to showcase the difference in relation to performance management facing management performance in the Chamber of Commerce and Industry in Mures County we applied methods of quantitative analysis and some graphic representation of the case study.*

Findings *– The Chamber of Commerce has a very specific management structure. If we take in consideration the study case of the Chamber of Commerce and Industry in Mures County its manager is the President of the Chamber who gives the main direction of the activity. But the management system consists of the Executive Vice-President, the General Secretary, other Directors and Head of different Departments. The President presents his activity for approval in front of the Chamber College. So, as we can see it is an intricate management system for which the analysis of performance can be complicated but it can provide informations on different leves of decision making and where there might be a switch from performance management to management performance.*

Research limitations/implications *–The limitation is provided by the complexity of the situation that needs to be analysed in order to have a precise picture of the Chamber of Commerce management system's implication*

Practical implications *– The research paper presents a high degree of a practical involvement, as it shows the impact that a large upper management component may have on the Chamber's performance.*

Originality/value *– The originality and value of this study relies on having a more realistic image of the decision process at the Chamber of Commerce in Mures County. As sometimes the performance of an organisation is strictly related to its management, this is a way to see if the Chamber of Commerce's focus is on its implication in the Chamber's activity or only on its performance.*

Key words: *Management, performance, sustainability, development, Chamber*

Introduction

Crossing many international economic crises and we can notice an increased level of concern in regard to the means of providing a more stable future. As people are more aware of the personal influence that each individual can bring to the community evolution, the requests for high quality members has increased.

This competitive landscape allows every individual to express themselves, but there are only few of them who can really cope with the responsibility to bring a plus value and generate community's performance. These few are the managers who, combining their knowledge, experience and skills succeed in providing for the organisation they manage predictability, continuity, stability, harmony and balance.

Setting all elements in balance is a very complex process as there is a need to work both the human factor and the processes in an organization. in conclusion, in order to evaluate the performance of the organization we need to balance which of the two stands out- performance management or management performance, when it comes to the Chamber of Commerce and Industry in Mures County.

As a NGO, the Chamber of Commerce has a very specific organizational chart. Being part of a national system, the Chamber of Commerce and Industry in Mures County has to submit to the National Chamber of Commerce's rules, but also has a local administrativ independence. With this independence comes also a great responsability.

As any organization is a social institution that is based on a target that is consciously planned and coordinated in association with the external environment, the management of the Chamber of Commerce in Mures County depends on the reaction of the economic market. Also, by being directly connected with the Chamber's members, its activity and performance is evaluated annually.

Peter Drucker believes that respecting an organizational structure is a method to achieve long-term and short-term goals in the organization. Taking this aspect into consideration we can say that the Chamber of Commerce's organizational structure provides a certain amount of stability that helps in the process of prediction of activities and development.

One of the most important of the tasks that a manager has is that of identifying good staff. In order to use at an optimal level this precious resource, a manager has to identify and help grow good working relationship at every level.

A manager has a very important role in the coordinated organization: he must project a socio-cultural image, he has the main role in giving the dimension of his unit. The better he knows the system, the better he will be able to uderstand the whole activity and connect with highly trained people that can bring great value.

Performance management at the Chamber of Commerce in Mures County

As the system has a very strict management structure and also a very specific type of activity the research problem is to identify means of introduction of new principles of management into the system, without unbalancing it, but creating stability.

In order for a manager to be performant, he must keep a certain balance between competence, responsibility and tasks, as proposed in Fig. 1- The Management's golden triangle.

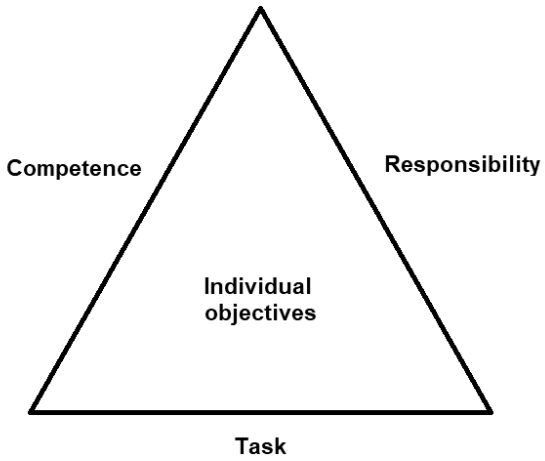

Fig. 1: The Management's golden triangle
Source: Lazar I & team, "General management", 2004

Being a performant manager is not an easy task,it requires the possibility to access knowledge and methods, techniques and skills that lead to the creation of a professional leader. Alexandru Puiu said in „Management - analyzes and comparative studies" that "Managerial leadership capacity is a multidisciplinary competence, the management profession assuming a set of capabilities, knowledge, techniques that go beyond the specialized starting points and aiming at organizing the activity, the strength and the skill to establish modern information flows, to make better use of human and material resources through correct decisions ".

Taking into consideration the qualities that recommend the president of a Chamber to have such a role we can say that the experience is very important as it provides a better vision in order to be able to accept the need to change and adapt to new conditions, one must have certain knowledge and capacities. A performant leadership requires a native talent that is sustained by a personal development through school, special trainings and experience.

There are many opinions about the responsibilities and actions that are specific to a manager and that can be a plus or a downside. The balance suggested by the golden triangle depends a lot on the manager's personal style.

Likert suggested a classification system composed of four cathegories:

- Very authoritarian style: managers unilaterally fix the goals, give orders, and are directed to exaggerated control. This style reduces productivity, decreases the satisfaction of the people and interest for the performed activity.
- Benevolent: managers unilaterally fix the objectives, but they accept to partially use the experience of the subordinates. The resistance is the smallest but still present. Subordinates will feel the duties as obligations and will not identify themselves in these goals, which only accidentally reflect their aspirations.
- Participatory: managers have a tendency to discuss labor and production issues with subordinates. Predecision consultation of subordinates gives them the opportunity to participate in decision-making and leadership.
- Extremely participatory style: a broad participation of subordinates in the production process. Discussions and suggestions of subordinates concern decisions on execution and on objectives, thus stimulating motivation and interest.

Taking into consideration the factors that determine the type and style of the management, and by doing so, its performance, there are two major systems: the team system requires a more democratic approach and the individual one creates a more authoritarian system.

The differences are best shown in the bidimensional modell, created by Robert R. Blake and Jane S. Mouton. Although Robert R. Blake and Jane S. Mouton taught and applied social psychology comprehensively and across boundaries, they were best known for creating and teaching the Managerial Grid.

Based on the two fundamental functions of leadership – task structure and human relations – they took the position that there was one best way to lead and manage. Blake and Mouton's 5-day Grid Seminar in the 1960's became popular worldwide.

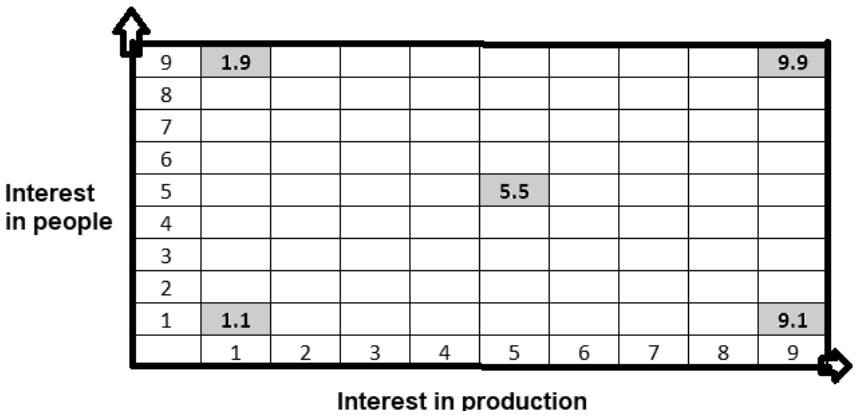

Fig. 2: Five types of management- interpretation of the Robert R. Blake and Jane S. Mouton modell

Taking into account the manager's interest in people and in production, as it is represented in fig. 2 there are five types of management:

- 1.9 The populist manager: he shows great interest in people, but very low interest in production. These managers want to create a family atmosphere at work, assuming that it will lead to maximum productivity of workers.
- 1.1 The incompetent manager: he tries to evoid any problems, doesn't pay attention to people or production.
- 9.1 Low interest managers: don't pay much attention to production or people, they only care about the tasks they give; they don't care about the people's needs.
- 5.5 Conciliator managers: they search to balance the people's problems and the production issues, so they can get performant results
- 9.9 Preocupied managers: they like to work with teams, they can create a trusting working environment

For the Chamber of Commerce in Mures County it is imperative that the manager gets close to a level of 9.9, as the number of employees is very small- 15 in 2018- and they are very well prepaired an skilled for their responsibilities. So, by being interested in the well being of the people, the manager-in this case the Chamber's President- shows direct interest in production.

But the performance of an organization depends on other factors too. According to Mintzberg's theory, as shown in Fig.3, there can be represented a structure that, if respected, can bring performance to any organization. These components are:

- The strategic apex: the manager and the upper leadership structure, responsible for the strategy and realization of targets;
- The middle line: middle management, the people that connect the operational core and the upper management;
- The operational core: the people responsible for direct production of goods and services;
- Techno structure: the people responsible for applying a certain standard
- Administrative personnel: provide direct or secondary services to support the operational core.

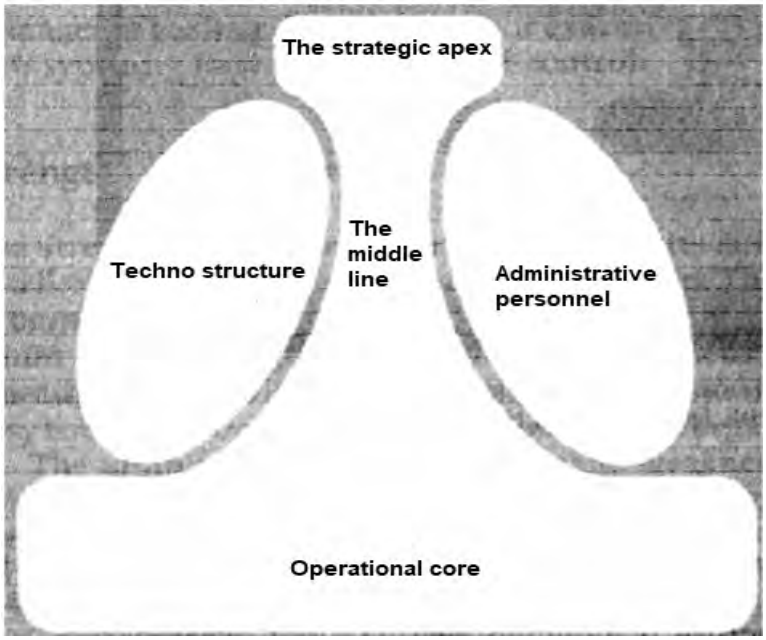

Fig. 3: The graphic representation of Mintzberg's Structure Modell
Source: Stephen P. Robbins, "Organizational Theory: Structure, Design, and Applications"

Even if as a structure these components are present in the Chamber of Commerce in Mures County, the "power plan" has another composition.

The strategic apex is formed by different decisional parties: the General assembly, Management College and President. As the influence in performance management is annualy, the first two components don't have a very strong influence in the decisional day to day process. So, the President remains a full time manager who's performance we analyze in this study.

The middle line is represented by the President Councelor, Direction Comitee, Vicepresidents and Executive Director. They have to make sure that the President's decisions are correct, and they must have strong personalities in order to not let themselves be influenced in their position.

The techno-structure and administrative personnel is being assured by the External Relations Diretor, Economic Director and Legal Office. They make sure that the decisional process is a correct one and the activity is in accordance with the high standards that the chamber has to apply, in order to be performant.

The operational core takes into consideration all middle and upper level management decision and put the direction into practice in order to provide good services.

This structure is best represented in the organizational chart shown in Fig. 4.

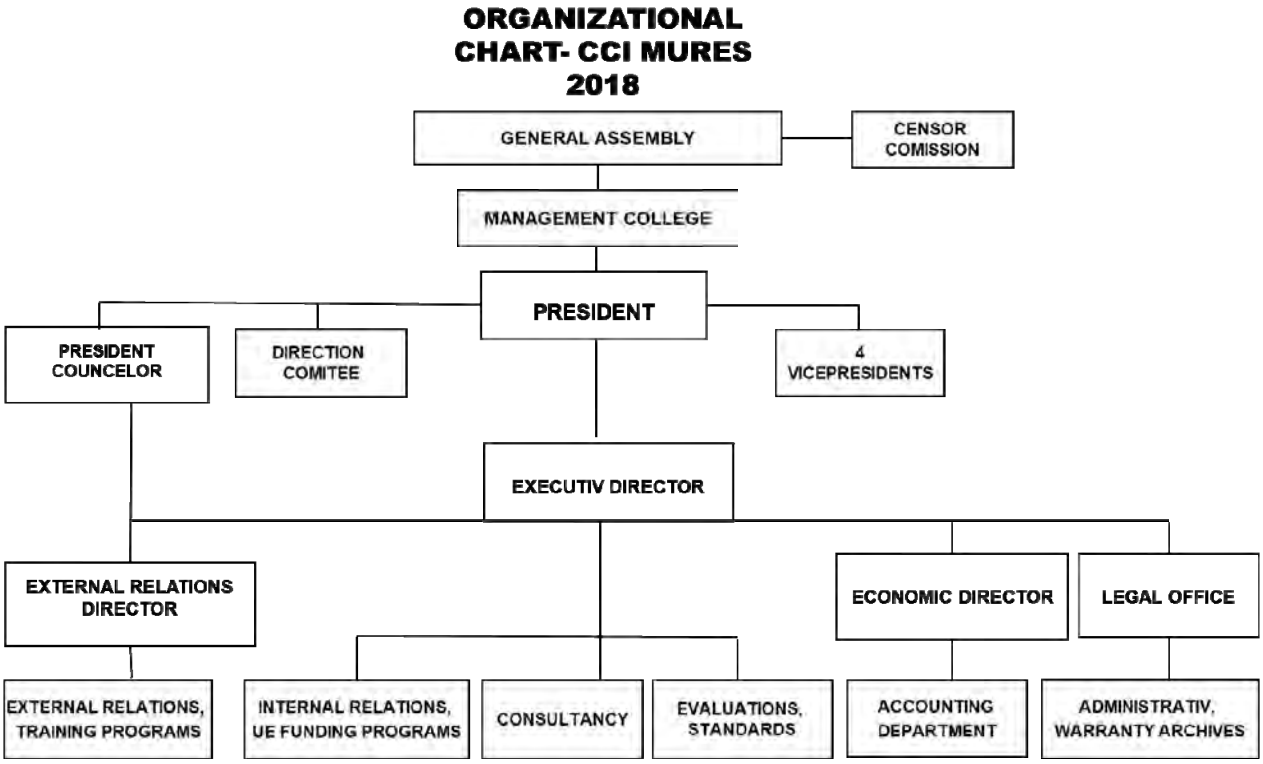

Fig. 4: The representation of the organizational chart of the Chamber of Commerce and Industry in Mures County

By studying this chart we can observe the close relations between departments and the small difference between middle management and higer management. Regarding the relation between manager and employees there can be defined different types of management:

- Autocrats: great capacity to take decisions, but don't take into consideration the participation of other employees in the decisional process, so their creativity may be lacking important elements.
- Democrats: these managers accept and embrace the participation of others, the limitation in this case is a longer process when problems appear.
- Neutrals: they give large directions, living a freedom of choice to their employees. This style only works in organizations with highly qualified personnel self-motivated to bring performance.

- Situational: they have an outstanding flexibility, they adapt their behavior to any combination of factors that may influence their organization. This type of manager laks personality and his actions can only bring short term performance.

The type of management regarding the relation between management and employees in our case study depends more on the project that needs debating.

Management performance at the Chamber of Commerce in Mures County

The performance at the Chamber of Commerce and Industry in Mures County is measured annually, by the gathering of the most representativs of its members and studying the results. Keeping up with the changes in the economic environment is the manager's duty, in our case the Chamber's President.

The annual evaluation of the management performance at the Chamber of Commerce in Mures County takes into consideration different criteria:

- ─ the turnover dynamics;
- ─ the number of new Members that the Chamber has gained or lost during one year;
- ─ bringing new services;
- ─ growing its activity;

For the evaluation of the Chamber of Commerce and Industry in Mures County management performance we have chose to highlight two such annual reports.

The periods chosen were of the year 2003 and 2017. 2003 was not a random choice, as it was the first year when the Chamber of Commerce was active on its own, without the Trade Register, that up to that point represented a main component of the Chamber.

As the President was the same for both periods, we can study the management decisions and see the proposed route of development.

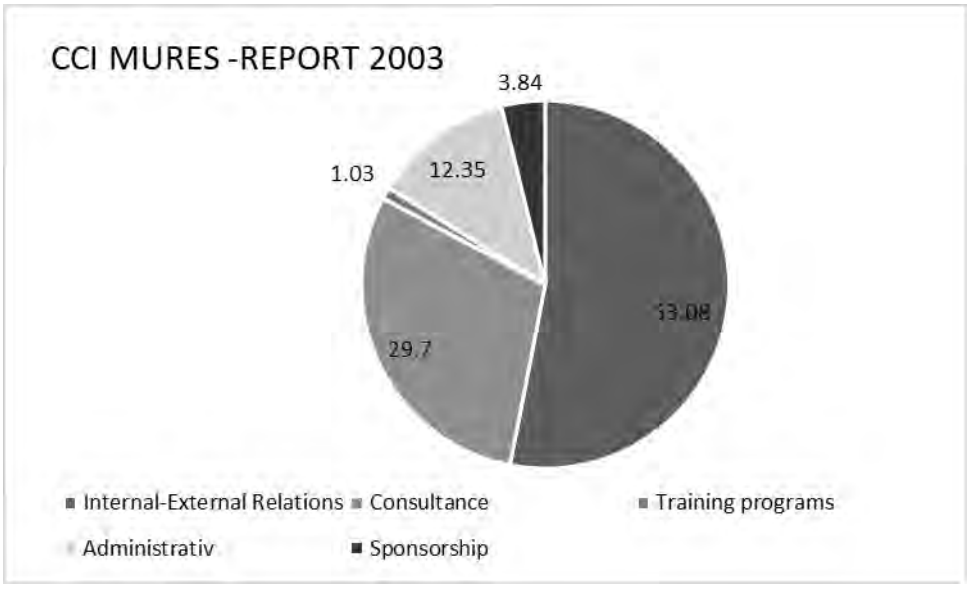

Fig 5: The Chamber of Commerce and Industry in Mures County- Report 2003

The perspective analysis of an organization requires a study of both management performance and performance management, as it relates to the manager's activity and how that reflects on results and the managerial team's ability to understand the requirements and to put into practice the right methods in order to have a high performance. The team has to be able to express in a free way their opinion, to trust the management's decisions, to evoit conflicts and opacity.

So, as the results show it (Fig. 5), in 2003 a large part of the Chamber's activity comes from internal-external relations (53,08 %) and consultance (29,7%). Not necessarily a great procent, we see that the Chamber had some income from sponsorship (3,84%), which shows that there was some interest to support the system, and we see a very small number in training programs (1,03%).

The development of the Chamber of Commerce in Mures County takes us to 2017 where we can see some dramatic changes (Fig.6).

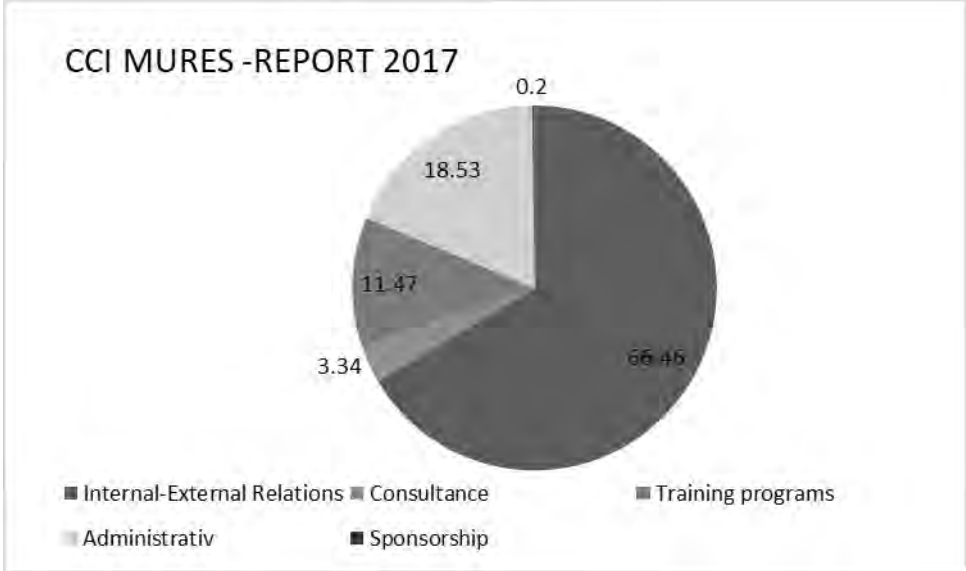

Fig. 6: The Chamber of Commerce and Industry in Mures County- Report 2017

From a management point of view, the main focus on growing the Chamber's performance is shown in a increased procentage in internal-external relations- from 53,08 % to 66,46% and also a growth in the training program- 11.47%. Because the Trade Register is now an independent organization, the consultance that was directly related to this former department of the Chamber dropped from 29,7% to 3,34 %. By the small procent of sponsorship we can deduce that management is interested in developing more activities and services to support the companies and is not necessarily interested in just obtaining funds.

Discussion and conclusions

We can say that the Chamber of Commerce is a classic type of organisation that we find around the world, with its role of sustaining the economy and all types of bussiness.

In a way, the Chamber represents a bussiness by itself, as it provides its own financial and development support and the manager has to be able to evaluate the Chamber's performance. With this paper we studied the ability of the Chamber's President to fulfill his role as manager an bring performance in a competitive landscape.

For the Chamber of Commerce, the conclusion of the analysis wether we have to study performance management or management performance in this organization is that being a structure with a high level of upper management departments but a small number of employees it becomes a very sensitive system that depends on performant managers. The decision making process doesn't occure at one level, it goes through an entire process and different levels of management are responsible for different levels of the decisional process and the performance of the Chamber, following these procedures.

Considering what this organization must be for the business community we can say that it has a capacity to adapt to changes, to have a macro dimension vision for the Chamber in order to be sustainable and performant in the future.

References

Blake, R. R., & Mouton, J. S.
1964
The managerial grid, Gulf Publishing, Houston
Druker, P.
2006
About the manager profession, Meteor Press Publishing, Bucuresti
Lazar, I. & team
2004
General management - I, Risoprint Publishing, Cluj-Napoca
Marian, L.
2001
Managementul proiectelor, Universitatea “Petru Maior”, EFI- ROM Publishing, Tirgu Mures
Puiu, A.
2007
Management - analize și studii comparative, ediția a III-a, The Independent Economic Publishing House, Pitesti
Stephen P. Robbins
1990
Organizational Theory: Structure, Design, and Applications, Third Edition, Prentice Hall, New Jersey
Verboncu, I.
2005
Do we know how to lead, Economic Publishing, Bucuresti

INCREASING THE QUALITY OF TECHNICAL HIGHER EDUCATION IN SATU MARE FROM THE PERSPECTIVE OF THE TEACHING STAFF WORKING AT THE TUC-N BRANCH

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Abstract

Purpose *– The results obtained through the present research are important as they can help to increase the quality of the activities from the TUC-N branch from Satu Mare.*

Methodology/approach *- The research was carried out through the events organized in the project "Specialists for Satu Mare". The method used was the survey, and as instrument one questionnaire for the teaching staff was drafted.*

Findings *– There is openness on the part of teaching staff to improve the quality of branch activities, and many of them want to get involved in solving existing problems, especially in terms of providing study conditions and promoting the university image, and less in the occasional administrative activities of the branch.*

Research limitations/implications *– Approximately 60 percent of the questionnaires submitted to the subjects were completed and returned.*

Practical implications *– The research recommendations can be applied in practice within the branch.*

Originality/value *– It hasn't been made such a research at the TUC-N branch from Satu Mare.*

Key words: quality, higher education, *teaching staff.*

Introduction

Higher education can be viewed from the perspective of:

- teaching staff: education must provide the training and professional development of young people in educational institutions, closely related to market requirements in order to increase their employability in the field after graduation.
- student: education materialized through the graduation diploma "brings beside the desired social status, of intellectual young person and a lot of psychological benefits, not neglected" such as "trust in yourself", " tranquility and peace of mind", the diploma being "the living proof of the fact that you deserve to be integrated into this society". (http://www.desprejoburi.com /index.php/2014/08/14/cat-de-mult-te-ajuta-psihic-sa-ai-facultate-si-master/)

A proof of the importance of the graduation diploma is provided by a survey of 5,000 leading companies from 20 countries illustrating that for an international company, the graduated university is the main selection criterion for employees: "45 percent of them consider that the faculty remains an important criterion and only a third of them looks strictly at the candidate's skills and experience". (https://www.hipo.ro/locuri-de-munca/vizualizareArticol/1126/Principalele-facultati-din-Romania-care-te-ajuta-la-angajare)

- society: education is meant to sort students in order to identify those "representatives of the elite to help them reach out to careers that maximize their potential, students being required to prove their intellectual abilities over many years and in several areas of knowledge", and, on the other hand, selects students according to their skills: separates, for example, those who are inclined towards humanities from those endowed with engineering sciences. (http://www.tincutaapateanu.ro/2011/10/22/de-ce-avem-universitati-%E2%80%93-o-dezbatere-despre-valoarea-sistemului-educational-american-si-nu-numai/)

No matter of which perspective higher education is viewed, it combines educational activities with research and technological innovation, which is why quality assurance (Oţel, C.C., 2006) in higher education must be a priority.

Improving quality in higher education addresses to several aspects related to: educational process, increasing the quality of teaching staff, managing student activities, infrastructure, research, faculty promotion activities, and international cooperation.

In this paper will be discussed some aspects regarding the improvement of the quality in the higher education which were mentioned by the respondents and can be applied at the Satu Mare Branch of the Technical University of Cluj-Napoca:

- The educational process - improving the way of course classes, seminars or applied papers at faculty level;
- Management of the student activities - development of psycho-pedagogical counseling center, organization of student scientific circles and award of the best presented works, organization and guidance of students for participation in professional competitions, organization of educational, cultural, sports activities for students from the faculties, improving the communication system with students, master students (at the level of faculty secretariats and departments);
- Infrastructure - improving the laboratories' facilities, improving the IT infrastructure (performing computers, wireless access, etc.) and endowing the library.
- Research - writing scientific research projects and papers published in ISI / BDI listed journals and conferences;
- Actions to promote faculties - actions to promote faculty study programs in order to attract the best high school graduates, through high school visits by the teams of assistants and students.

Results of the research

95 percent of the teaching staff responded positively, being interested in improving the quality of the activities carried out at the branch in Satu Mare (Figure 1).

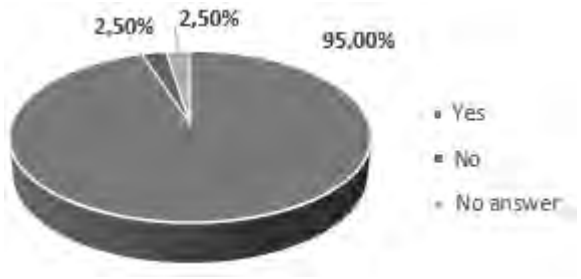


Figure 1. Are you interested in improving the quality of the activities carried out at the TUC-N branch in Satu Mare?

Also, in a high percentage, 80 percent want to be involved much and very much in solving the problems of the branch (Figure 2).

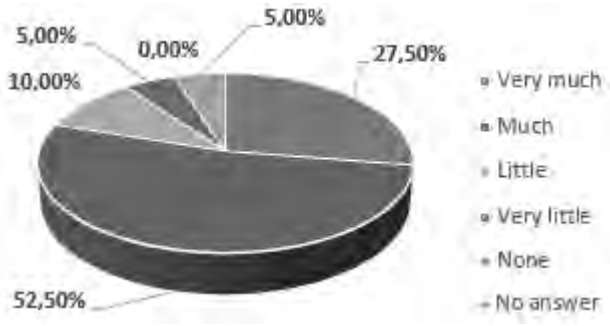
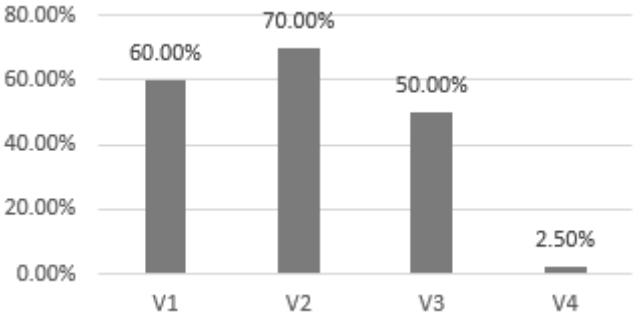


Figure 2. How much do you want to get involved in solving the problems of the branch/university?

“Activities for organizing to ensure the study conditions” (70 percent), "activities for promoting the branch/university image" (60 percent) are the main activities the professors think, they can get involved in the branch. Only half of respondents believe that professors can be involved in "scientific research" activities, which places it only on the 3rd position in the options. This question had four variants of answer, one or more of which could have been chosen (Figure 3).



V1 = promoting the branch/university image;
V2 = organizing to ensure the study conditions;
V3 = scientific research;
V4 = other: "improving the didactic activity".

Figure 3. In what activities do you think the professors that teach in the branch can be involved?

75 percent of the professors are satisfied with the material basis existing at the branch in Satu Mare, appreciating it as good or very good (Figure 4).

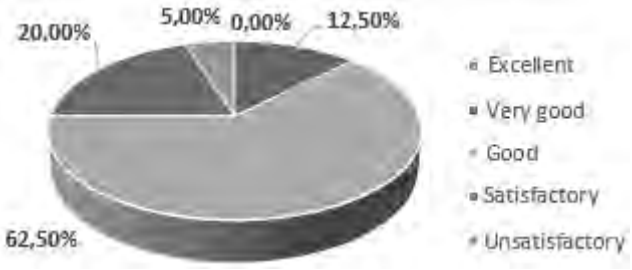


Figure 4. How do you assess the material basis of the TUC-N branch in Satu Mare?

The above percentage of only 75 percent can be justified by the necessity of endowing the library with documentary material, because only 50 percent of the professors appreciate the library's endowment as good and very good (Figure 5).

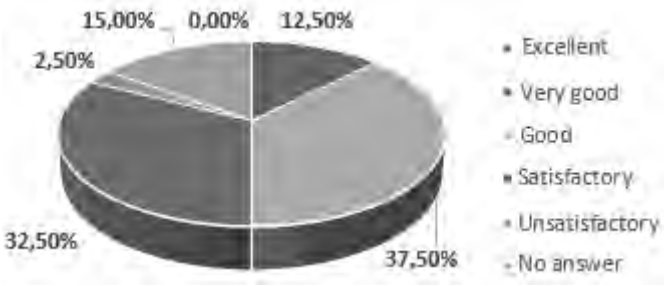
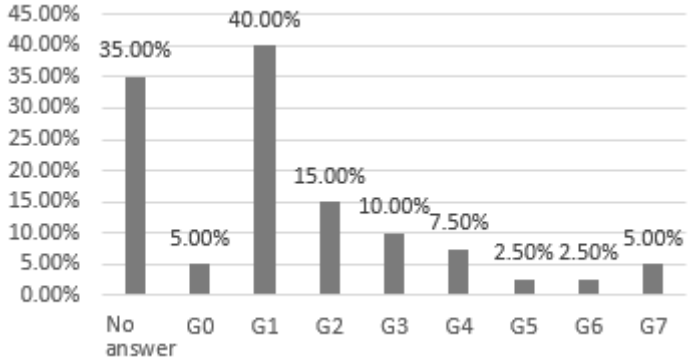


Figure 5. How do you evaluate the endowment of the library with documentary material?

Among other endowments that professors consider necessary for the branch include: "laboratories/equipment" (40 percent) and then "rooms with video projector" (15 percent), "large blackboards/interactive" (10 percent). Unfortunately, 35 percent of professors did not answer this question (Figure 6). This question was open-ended, so in order to interpret the results, the answers were grouped into seven groups (G1-G7). One respondent could mention several aspects, so the answer could fit into several groups.



G0: satisfied;
G1: laboratories/equipment;
G2: equipping rooms with video projector;
G3: large blackboards/interactive;
G4: reading room / access to specialized publications / teaching materials under electronic format;
G5: recreation room;
G6: access to drinking water;
G7: internet access.

Figure 6. What other endorsements do you consider necessary to improve teaching activities?

Only 50 percent of professors would be willing to engage in occasional administrative activities of the TUC-N branch in Satu Mare (Figure 7).

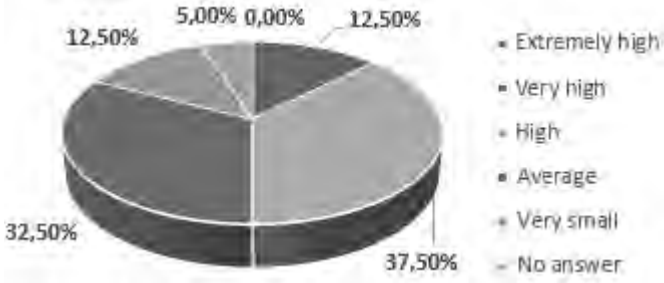


Figure 7. To what extent are you willing to engage in occasional administrative activities of the TUC-N branch in Satu Mare (timetabling, admission, reports, documents requested by other university structures)?

Communication with the branch secretariat is good, very good or excellent, as all professors (100 percent) who have been questioned (Figure 8) have appreciated it.

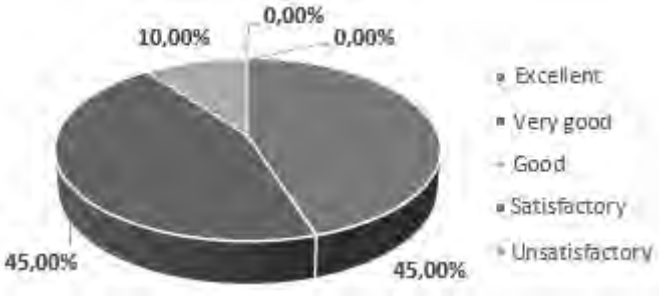
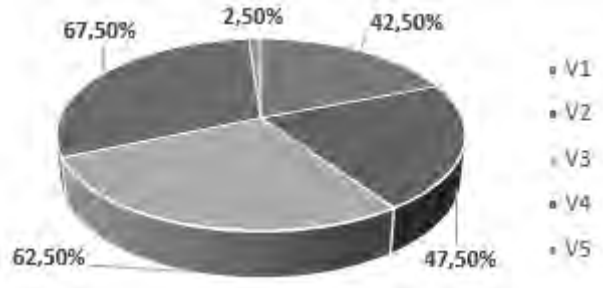


Figure 8. How do you appreciate the communication with the branch secretariat?

Professors consider that extracurricular activities such as "counseling - professional guidance" (67.5 percent), "communication/socialization" (62.5 percent) are the most important activities that should be developed for branch students. This question had five answer variants, one or more of which could have been chosen (Figure 9).



V1 = cultural;
V2 = sports;
V3 = communication/socialization;
V4 = counseling - professional guidance;
V5 = other: "student circles, sessions of student scientific communications".

Figure 9. What extracurricular activities do you think should be developed for the branch students?

Conclusions and recommendations

As a result of the research, we can draw the following conclusions:

- 95 percent of professors are interested in improving the quality of their activities at the branch in Satu Mare, and 80 percent of them want to get involved in solving the branch problems.
- Given that Romanian universities are increasingly focusing on research, we can state that the positioning of the "scientific research" activities only on the 3rd position out of 4 options is surprising, only half of the respondents have nominated it, although the research is necessary to a large extent for the admission to a higher teaching degree. “Activities for organizing to ensure the study conditions” (70 percent), "activities for promoting the branch/university image" (60 percent) are the main activities the professors think, they can get involved in the branch.
- Only 50 percent of professors would be willing to engage in occasional administrative activities of the TUC-N branch in Satu Mare.
- 75 percent of the professors are satisfied with the material basis existing at the branch in Satu Mare and 50 percent of respondents consider it necessary to endow the library with documentary material. Also, "laboratories/equipment" (40 percent) was another quite common request.
- According to professors, the extracurricular activities needed for the students to be developed were "counseling - professional guidance" (67.5 percent) and "communication/socialization" (62.5 percent).

The recommendations that need to be mentioned following the results obtained are:

- To take measures to improve the endowing of laboratories with the equipment and the library with documentary material.

- To aware professors on the need to involve them in attracting funding funds through scientific contracts in order to improve infrastructure and equipping the branch with modern equipment.
- To designate specialists to assist students in "counseling - professional guidance" activities (67.5 percent) and "communication/socialization" activities (62.5 percent).

Acknowledgements

This paper focuses on the results obtained from the implementation of the project "*Specialists for Satu Mare*" funded by the Satu Mare Local Council through the "G.M. Zamfirescu" Cultural Centre of Satu Mare, and the Technical University of Cluj-Napoca, contract No. 3/444/11.04.2016, project manager: Șef lucr.dr.ing. Călin Ciprian Oțel. We take this opportunity to thank all parties involved in the implementation of the project.

References

Apăteanu, T.
2011
De ce avem universități? – o dezbatere despre valoarea sistemului educațional american (și nu numai), http://www.tincutaapateanu.ro/2011/10/22/de-ce-avem-universitati-%E2%80%93-o-dezbatere-despre-valoarea-sistemului-educational-american-si-nu-numai/, accesat la 10.03.2018.
Oţel, C.C.
2006
Conceptul de calitate, Revista de Management şi Inginerie Economică, volumul 5, nr. 2(18)/2006, Editura Todesco, Cluj-Napoca.
***
Despre joburi, (publicat la 14.08.2014), Cât de mult te ajută psihic să ai facultate (şi master)?, http://www.desprejoburi.com/index.php/2014/08/14/cat-de-mult-te-ajuta-psihic-sa-ai-facultate-si-master/, accesat la 23.02.2018.
***
Hipo, (n.d.), Principalele facultăți din România care te ajută la angajare, https://www.hipo.ro/locuri-de-munca/vizualizareArticol/1126/Principalele-facultati-din-Romania-care-te-ajuta-la-angajare, accesat la 12.03.2018.

AGRICULTURAL LAND MANAGEMENT USING DRONES

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Abstract

Purpose *– Paper aims to implement a full solution in farm management approach using information technology, global satellite navigation systems, remote sensing and proximity data collection systems.*

Methodology/approach *– Methodology approached aims to develop a fully farm management based on low cost noninvasive monitoring system implemented with the drone that can acquire a large collection of data to generate an agronomic map.*

Findings *– Development of a precision agriculture is sustainable to optimize agricultural production and profitability, help agricultural enterprises to practice high quality agriculture with cost savings and protect natural resources.*

Research limitations/implications *– Activity of monitoring agricultural vegetation in real time involves processing of large volumes of spatial data ranging from weather data to satellite images and involves a large number of devices and sensors to provide necessary information.*

Practical implications *- To increase the profitability of the farm the results obtained by data acquisition sessions must be linked to spatial and temporal information obtained by combination of several maps corelated with input and predictive yield information.*

Originality/value *– Image collection with help of drones is aimed both at evaluating the environment through improved performance as well as performing high-performance topographic measurements with a higher resolution than provided by satellite monitoring.*

Key words: *drones, photography, topographic measurements.*

Introduction

Precision farming is management agricultural concept based on the observation, measurement and response to intra and inter-fields variability in crops or animal breeding aspects. The benefits to be achieved is mainly due to increased yield and / or increased production profitability to the farmer. Other benefits come from increased animal welfare, better working conditions and potential to improve different aspects of smart farming. Thus, precision farming contributes to the goal of growing and sustaining agricultural production (European Parliament, 2014).

Implementation of precision farming has become possible due to the development of sensor technology, combined with the binding of variables mapped to appropriate agricultural practices, such as: seeding, fertilization, herbicides and application of pesticides, plant harvesting and animal husbandry. The key feature of precision farming comes from positioning systems, mainly global satellite navigation systems (GNSS), which are a major factor „accuracy". Precision agriculture has advanced the most among farmers who own large farms with arable land. Controlled traffic farming (CTF) and automatic guidance systems are great successful applications on arable land which has clear benefits in almost all cases. Among the methods of application of variable rate (VRA) such as fertilizers or pesticides optimization according to need, success varies greatly depending on application specific factors. The current briefing, based on detailed analysis, confirms that precision farming can play substantial role in European Union in meeting growing demand for food, both for

people and for animals and raw materials, while ensuring sustainable use of natural resources and the environment (European Parliament,2014).

Research problem

Many devices are currently available and used for data collection or providing information as part of implementation of precision agriculture. These devices exist to assess soil condition, such as: apparent soil electrical conductivity (ECa) sensors, radiometric sensors and soil moisture sensors, e.g. near-infrared sensor useful in soil property & moisture analysis, water management, crop health stress analysis, plant counting etc. (Krishna, V., Kumar, C. and Surya, V.G., 2016). Others record weather or microclimate information (thermometer, hygrometer, etc.). Particular importance is attached to sensors developed to quantify the physiological state of cultures (nitrogen sensors). These sensors contribute to the formation images by remote sensing (European Parliament, 2014). Monitoring agricultural vegetation in real time and world-wide involves processing of large volumes of spatial data ranging from weather data to satellite images and increasing global crop production. Analysts AGRIFISH - working mainly for the evaluation and interpretation of spatial data sets, are also involved in the purchase, storage and redistribute them. Together with foreign partners have developed large geographic databases and in accordance with INSPIRE directives (European Parliament and of the Council of the European Union, 2007).

Considering the correspondence with the representatives of the European Commission - Joint Research Center through which APIA requested support for the purchase of a set of VHR satellite imagery, supplementary to images allocated to each member state, was decided to allocate images through the COPERNICUS program on the basis of which the remote sensing control for farmers is carried out compared to the control sample for application year 2016 and which were not under the coverage area of the initial control sites. Those were purchased through the European Space Agency from the COPERNICUS hub.

Airborne platforms and satellites often aim to highlight the vegetation indices, such as the state of crop coronation (chlorophyll content, stress level), and their variability in space and time. Of particular interest is manifested lately for use of unmanned aerial vehicles (UAV) - often called drones (Rosca S., et.al., 2018), and the remotely piloted aircraft systems (RPAS), originally developed for military purposes, now used and in civilian applications. RPAS are already available and operational, enabling the generation of images at the farm with a very high resolution, e.g. 3 cm at 60 m flight altitude up to 10 cm at higher altitude (Baeck, P., et al., 2016). The availability of satellite platforms is generally at a lower resolution (0,5-10 m) and is more expensive, useful in general to monitoring desertification in which case it can identify for example grasslands and sparse shrublands with accuracy between 66 to 79 percent; the new program COPERNICUS provides easier access and free of charge to satellite data (Murugan, D. Garg, A. and Singh, D., 2017). There is a need for knowledge and skills on how to transform the Geographic Information System (GIS) data collected by different sensors and geographical references in maps to provide information about the physiological status of crop and soil condition. A GIS (geographical information system) is a thematic mapping system which allows for the production of maps based on themes such as soils or hydrology (Oshunsanya, S. O. and Aliku, O., 2016). Further skills and knowledge are needed on how to use large, heterogeneous databases and information collected to evaluate the effects of weather, soil properties on production and to develop management plans to increase efficiency and adjustment entries in the coming years. In particular, models are needed to understand the causes and interrelationships between plants, soil and climate before spatially adjustable inputs. These agricultural management systems are made available to farmers through advisory services, consultancy and training and/or directly through dedicated software (European Parliament, 2014).

The research methodology

The drones used in agriculture are ideal for collection and interpretation of the data in real time were particularly useful for mapping, diagnosis and treatment of Romanian crops and soils. The proposed system is an intelligent system – drone georeferenced GIS-GPS integrated scanning system of soil and real-time telecommunication with a ground base for automatic data processing (Gazeta de

Agricultura, 2014). Agronomic mapping is based on captured data, determining the variability of plots. The data are interpreted in terms of agronomic using a mathematical model developed, resulting „Agronomic map". The software recommends, based on results obtained, the calculation of nitrogen needs and irrigation for each plot. Agronomic map generated by the system include: the amount of biomass/quantity of nitrogen from soil/soil water quantity.

To make a flight map over fields of rapeseed and wheat we used the Parrot Bebop 2 drone, as presented in figure 1, based on GPS coordinates recorded previously to establish a GPS route to collect images visible to a very high resolution due to the fact that the drone is equipped by the manufacturer with a 14 mega-pixel camera, with fish-eye lens and optical sensor Sunny, 180 ° fish-eye lens: 1 / 2.3 "aperture (Gamulescu, O.M., Risteiu, M.N. and Popa, R.G., 2016).

This quadcopter is a low cost, high stability, with inbuilt Wifi Hotspot, GPS and with ability to adjust the orientation of the high resolution monocular camera digitally independent of the quadcopter motion (Duggal, V. et.al., 2016).

Figure 1. Drone during data collection

Figure 2 present images obtained with this drone for monitoring a field cultivated with rapeseed and wheat in Diculesti, Valcea county.

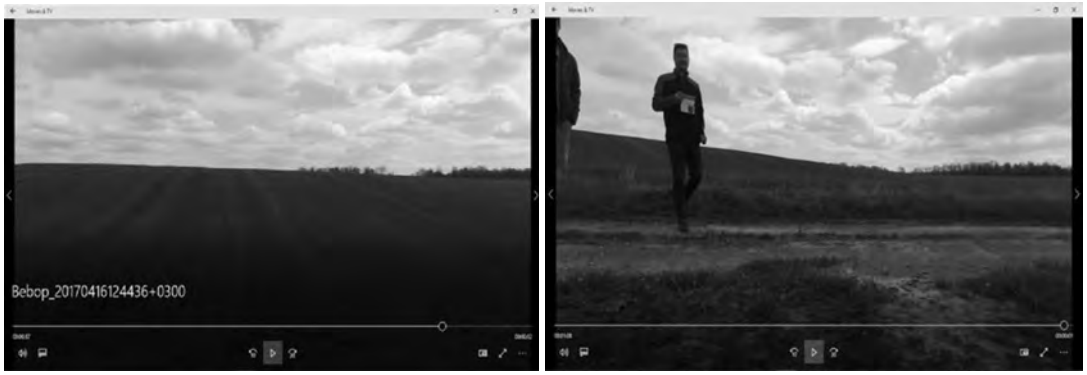

Figure 2. Monitoring of rapeseed and wheat crops by drones in Diculesti, Vâlcea county

Compared to random sample analysis of small land samples, the use of drones automatically affects the treatment to be applied by parcel scanning and parcel automation analysis (figure 3).

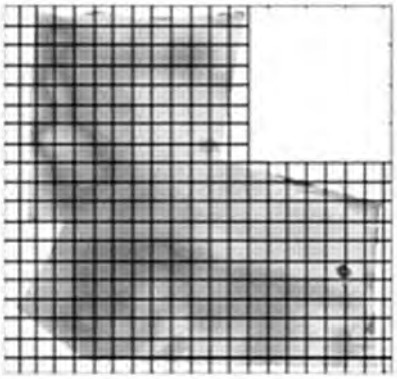

Figure 3. Intelligent drone systems (Gazeta de Agricultura, 2014)

Decision making on farms where spatial and temporal information is available requires a fusion of several maps together with input and predictive yield information. Input optimizations are calculated using such field information but must be related to the input and output costs incurred to determine the economic profitability of the farm.

This cost analysis is most important parameter in optimizing entries and needs to be supported by specialist advisers. Specialist advisers interpret maps, go to fields and use software to advise the farmer. Councilors may be part of larger organizations providing additional services such as nitrogen detection or soil properties or are suppliers of integrated agricultural goods. Other counselors are specialized for certain services, such as organizations providing information on crop growth and performance information from satellite, airborne and unmanned systems, as well as counselors in the development of agricultural systems such as conservation agriculture or control of traffic farming systems.

Contract services have increased rather rapidly but they are a function of the available funds of farmers; that is, these services are likely to be reduced in years of poor returns.

Field mapping and soil sampling with GNSS are two most popular services, but satellite imagery and yield monitor data analysis use has increased in last few years and show an even greater rise forecast to 2016. The adoption of additional precision services over time (figure 3) shows a steady increase with an expected rapid increase towards 2016 (European Parliament, 2014).

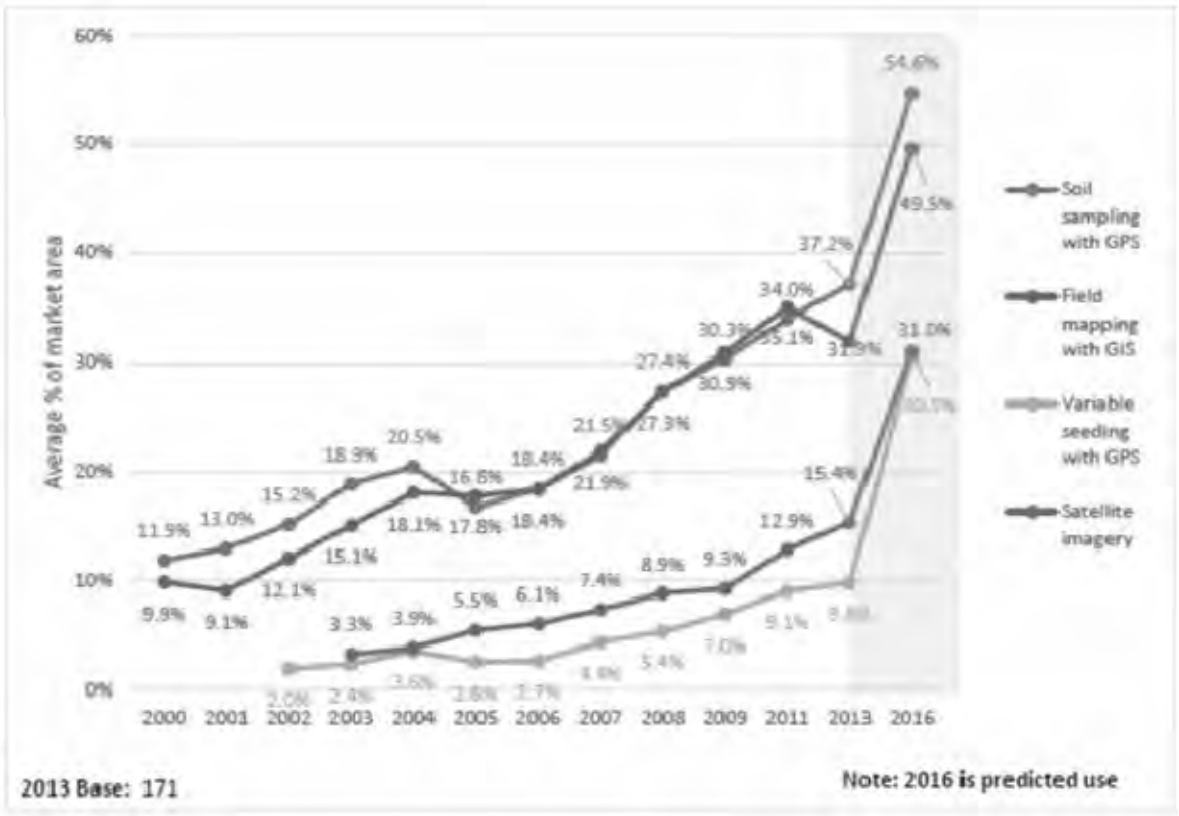

Figure 4. Precision services in agriculture offered over time (European Parliament, 2014)

It is generally accepted that precision farming is an inevitable fact because new information technologies will have an impact on agriculture in Europe and around the world. Open question is: What technologies will be adopted and how fast? It also considers that the adoption of precision agriculture has lagged behind initial expectations. In some cases, precision agricultural technologies have not delivered the promised benefits and many farmers were disappointed and reluctant to invest in precision agriculture. Some of major constraints for the adoption of precision agriculture highlighted in several studies were the complexity of existing technology at this time, component incompatibility, time requirements, and lack of profitability (European Parliament, 2014).

Discussion and conclusions

Considering the future social and environmental needs main challenge for EU agriculture will be its ability to provide a high level of production while improving the protection of natural resources. Precision agriculture is an information-based, decision-making approach to managing farms, designed to improve the agricultural process by accurately managing each step. In this way, it can provide a management approach that optimizes both agricultural production and profitability - which is the primary objective of most agricultural enterprises. In addition, some of the profitability can come from the reduced use of inputs (cars, labor, fertilizer, chemicals, seeds, water, energy, etc.), which leads to cost savings and also to environment benefits. Today, the technological infrastructure of precision farming is in place to support a wider implementation.

As a benefit the use of the drones has no time and space constraints compared to „walking in the field" or by using remote sensing satellites although it may be necessary to consider the atmospheric impact such as temperature and humidity when capturing images. Essentially, drones-based products can save money, time, satisfy multiple requirements and achieve real-time monitoring of precision farming.

A unique advantage of using drones is that it provides a fast response of farmland data with the high fidelity detail. A surface of hundreds of hectares can be covered by a single flight and, at the same time, with a much higher spatial resolution than in case of images obtain by human flight crews or by field studies. The use of drone in agriculture, particularly in precision farming together with farm management, has been growing steadily over the past 5 years. Drones are a revolutionary tool for obtain information about the development of a crop and for this reason for boosting yields and maximizing production efficiency.

The advantages of intelligent drone systems are: automated non-destructive analysis at full plot level; low time; uniform analysis; monitoring large cultivated areas in a short time due to the ability to fly to high altitudes and the ability to supply farmers complete agricultural crops data, due to the ability to capture multispectral images (both visual spectrum and infrared); finding the problems from soil variation, irrigation problems, infestation with pests and fungal that cannot be directly identified by human eye and may also prove useful in weed management, identification of differences between healthy and distressed plants; application customized treatment for every situation and even livestock monitoring on farm.

In terms of intelligent drone systems used in precision agriculture we also identified a number of limitations such as: the cost necessary to purchasing a drones does not include the cost of collecting, processing and producing images in the absence of specialized software for photogrammetric data processing, this software must be purchased separately; system is affecting by air traffic restriction and depending on the weight of the drones; requires the issuance of an identification certificate issued by the Civil Aviation Authority; it cannot be used for monitoring agricultural crops in extreme weather condition like strong wind or rain; in generally for economic reason the payload of the drone is limited so as not to affect battery autonomy while the camera sensor is not as stable as high-end sensors, resulting in reduced image quality capture on monitoring session.

It is often more economical to buy a new drone specialized for precision agriculture e.g. to acquire a thermal camera to be used for mapping plant water than to upgrade your own drones with supplementary sensors specialized for soil and crops condition, especially due to the incompatibility of components between manufactures but also on the fact that the autonomy of the drones will decrease.

References

Baeck, P., Blommaert, J., Delalieux, S., Delaure, B., Livens, S., Nuyts, D., Sima, A., Jacquemin, G., Goffart, J.
2016
"High resolution vegetation mapping with a novel compact hyperspectral camera system", In: 13th International Conference on Precision Agriculture

Duggal, V., Sukhwani, M., Bipin, K., Reddy, G. S., & Krishna, K. M.
2016
"Plantation monitoring and yield estimation using autonomous quadcopter for precision agriculture", In Robotics and Automation (ICRA), IEEE International Conference on (pp. 5121-5127). IEEE

European Parliament
2014
http://www.europarl.europa.eu/RegData/etudes/note/join/2014/529049/IPOL-AGRI_NT%282014%29529049_EN.pdf (in press)

European Parliament and of the Council of the European Union
2007
"Directive 2007/2/EC of the European Parliament and of the Council of 14 March 2007 establishing an Infrastructure for Spatial Information in the European Community (INSPIRE)"
https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32007L0002&from=EN

Gamulescu, O.M., Risteiu, M.N., Popa, R.G.
2016
"The drones, a modern innovation impacting areas of the site Natura 2000 ROSCI0128 North Eastern Gorj", Annals of "Constantin Brancusi" University of Targu-Jiu, Juridical Science Series, 3

Gazeta de Agricultura
2014
“Sisteme inteligente cu drone pentru agricultura din Romania”
https://www.gazetadeagricultura.info/masini-si-utilaje-agricole/16722-sisteme-inteligente-cu-drone-pentru-agricultura-din-romania.html (in press)
Krishna, V., Kumar, C., & Surya, V. G.
2016
“Unmanned aerial vehicle in the field of Agriculture”, Frontiers of Current Trends in Engineering and Technology
Murugan, D., Garg, A., Singh, D.
2017
“Development of an adaptive approach for precision agriculture monitoring with drone and satellite data”, IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing, 10(12), 5322-5328
Oshunsanya, S. O., Aliku, O.
2016
“GIS Applications in Agronomy”, In Geospatial Technology Environmental and Social Applications, InTech
Rosca, S., Leba M., Ionica A., Gamulescu O.
2018
“Quadcopter Control using a BCI”, IOP Conf. Ser.: Mater. Sci. Eng. 294 012048
https://doi.org/10.1088/1757-899X/294/1/012048

THE IMPLICATION OF PSYCHOLOGICAL PROCESSES IN MANAGERIAL DECISION MAKING

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Abstract

Purpose *– The objective of this paper is to present the scientific perspective of the authors that have been writing on the topic of managerial decision and the implication of the psychological factors, and to put forward some guidelines concerning the following question: How psychological processes are involved in decision making process?*

Methodology/approach *– The methodology used for this article was bibliography research.*

Findings *– There is a tendency of authors from specific literature to separately present the psychological processes when they talk about managerial decision. Their inclination is to present mainly the implication of the cognitive processes.*

Research limitations/implications *– My focus in this research was on the main psychological processes and less on the secondary ones, as they were more highlighted in literature by other authors.*

Practical implications *– This research aims to present that managerial decision is influenced also by the cognitive and affective processes, and manager should be more aware of this interaction, in order to improve the way they decide in different situations.*

Originality/value *– Understanding the implication of psychological processes in managerial decision offers a new perspective about it, and opens new research directions, necessary for a good and real deepening of this subject.*

Key words: *managerial decision, psychological processes*

Introduction

The manager is the center of the organization through his position, but also because of his attributions; this is the reason why, defining a manager is strongly related to providing a perspective about his decisions in organization. As Rita (1980) showed many years ago, one of the main activities of manager is to have good and right decisions, to perform the objectives of the institution he handles. For the manager to decide this means to observe, to select, to stipulate, to assume, but also, to answer the questions. As Jennings and Wattam (1998) remarked, it is impossible for an organization to exist without managerial decision, which distinguishes the manager from the employees (Natale, Libertella, Rothschild, 1995). The importance of managerial decision in organization determined authors from specific literature to present it through the perspective of different sciences and theories. One of these is strongly related to psychology theories, many authors preferring to offer a different perspective of managerial decision through the psychological processes action. Several authors showed that psychological processes are one of the factors that are strongly related to managerial decision (Constantin, 2012, Dietrich, 2010, Petrescu, 1998). There are three different author's perspectives on managerial decision through the lens of psychological processes. The first one presented managerial decision from the eye of cognitive processes (the most commonly find is thinking), while the second perspective presented the key of Management through affective processes (in this sense, emotions were the favorites). There was also a third point of view, mixing the two previous ones, where authors preferred to present managerial decision from both perspectives. The last perspective was the least presented in literature, but it was also a very important one, which offered a different point of view on decisions in organizations.

Results of the bibliography research

Generally, when underlying the presence of psychological processes in managerial decision, authors preferred to present mainly **the implication of cognitive processes**, as principal ones involved in manager's principal activity. It is not something unusual, as the importance of these processes is already known and accepted by most of researchers, especially if the topic is related to activity that implies human activity. Giving points to cognitive processes and underlining their importance, it offered a special perspective about managerial decision. This perspective was presented by Ormond (1993). He said that rational is the key in solving the problems that manager faces out during decisional process. He can solve these issues, by using thinking as a leagued and a resource he owns.

Following the same direction, Samson (1988) said that in taking decisions the rational has an important role, especially in the case of complex decisions. Putting together thinking and decision making, the author affirmed that managerial daily activity can't be separated by the principal process known in literature, as it would be a big mistake. Some of the authors (Stan, 2012) delimited managerial decision from the rational choice, the last one being algorithm-based reducible to a probabilistic process. Matzler, Uzeleac and Bauer (2014) spoke about the intuition in managerial decision, connecting this one with thinking, especially when we discuss about the decision made in constraint situations. It is also what Vanharanta and Easton (2010) were also underlining in an article, presenting intuitive managerial thinking as an allied of manager in taking decision. Another term connected to thinking in managerial decision making was wisdom, (Melè 2010) understood as a rational activity, and its necessity in taking decisions. Pavic (2008) presented the steps that manager takes in making decisions, and the role of thinking, as a managerial process in these steps.

A quality decision, from author's perspective, was closely related to manager's rational abilities. As we can see, the importance of rationally in decision making is an undeniable truth, and the authors prefer to throw out into relief the role and the effect produced by this on the main activity of the manager. Being a rational process from the beginning to the end, managerial decision is a way of showing manager's qualities and abilities, and underline, in the same time, the relationships within the organization. The presentation of the managerial decision by the medium of cognitive processes confirms the primate of these in our life, and explains the mechanism that exists from this perspective in all managerial processes. The primacy of thinking, as a main process proofs one more time that such a complex and important activity occurs only on the action of this one.

Another perspective (the second one) on managerial decision making in connection to psychological processes presented it through the **affective processes**. This direction offered another view on managerial decision, and opened a new understanding of the principal activity of manager in organization. When discussing this topic, the authors preferred to underline the importance of emotions in making decisions by manager, and the influence of these in manager's behavior when making decisions within organization. On the other hand, we can see that, in this direction the authors offered a different perspective about decision and the behavior affiliated to this. As the cognitive processes influence the choice of manager in taking decisions, the emotions were also presented in this managerial activity.

One point of view belongs to Sayegh, Anthony and Perrewé (2004). They presented the role of emotions in managerial decision making. The authors underlined the importance of emotions in an intuitive decision processes under crisis conditions. Wittmer (1992) is one of the authors who presented the emotional implication in managerial decision making. He admitted that emotional side is a very important factor in the ethics of managerial decision. He also talked about sensitivity and emotions a manager may have in the whole decisional process. Another point of view, described by Lakomski and Evers (2010) underlined the importance of connecting the rational decision with the emotional support. From their perspective, a decision involves also rational and emotional part, and it is better to have both in the managerial activity. Furthermore, many other authors (Hasset, Reynolds, Sandberg, 2018) showed the importance of emotions in managerial activity. It is about, especially the manager's personality and actions, but also the relationship manager-employee, some of decisions being orientated directly to the last one.

A decision has effect, first of all, on decision-maker, but also on employee; and the emotions have a great role in this relation. A decision is usually put in practice by employee, and the process of taking decisions is strongly related, from emotional point of view, by the communion manager-employee. We can also speak about emotional and affective processes when manager delegates employee to decide

instead of him. Besides a good knowledge of the person, the presence of the affective processes is incontestable in delegating a responsible person for taking decision. In this case, a manager can choose a person, using both, intellect and heart. It is difficult to choose only with the brain, because, through this act, the manager confides a part of his activity to that person, the main form of what he is. Wen and Zhou (2009) were highlighting, on this line, that they find absolutely necessary.

There is also a third perspective, a middle one of the authors regarding the presence and the influence of rational and affective in making managerial decision, presented together, interacting in decisional process. As representative of this perspective, Stewart (1996) had a specific view on managerial decision. Defining it as the essence of Management, he presented it as located in the heart of every manager. This perspective was a very interesting one, because it offered a double perspective about managerial decision. Separating affective from rational in taking decisions representing an unwelcome desideratum, many authors considering that a complex image of managerial decision must be seen from both perspectives. Following this idea, Holloman (1992) said that this collaboration between rational and emotional in taking decisions is absolutely necessary. In this sense, paraphrasing Fulton Oursler when taking decisions, we must use the brain God gave us, but also the heart He gave us. This words show us the interaction between cognitive and affective processes in taking decisions. It is almost impossible to separate one of other in this activity, or to give priority to rational and not to emotional, as well. Even we are tempted to see rational as a principal factor in decision, removing emotions from this activity could be a way of presenting the whole managerial process.

Once a manager decides, some changes occur in his personality.

1. From cognitive perspective – once adopted, a decision brings new horizons requiring different operations of thinking (analyzing, comparison, or evaluating). There is also a link between one decision and the next one, and this requires again, cognitive processes. After taking a decision, manager must observe its effects and the impact on the employees, and organization.
2. From affective perspective – a decision could change manager's mood, especially if it involves people. For example, the decision to hire an employee can affect manager from affective point of view. That's why, these decisions that affect employees are the hardest to take.

Discussion and conclusions

Managerial decision is a complex process that involves and connects different psychological factors, and even thought authors tried to focus on some of them (cognitive or affective) we believe that we should see it through the lens of all processes interconnected. From the perspective of psychological processes, the whole decisional process could be better understood and the manager could have a clearer image of the processes interactions and effects.

References

Bonci, C. D.,
2014
Decizia managerială – precizări conceptuale și terminologice, Revista de investigare a crimnalității, anul VII, 2:108.
Constantin, E.-C.
2012
"Delimitări conceptuale privind managementul decizional." Studii de securitate publică, vol I, 4: 153-163.
Dietrich, C.
2010
"Decision Making: Factors that Influence Decision Making, Heuristics Used, and Decision Outcomes" Student Pulse, *2*: 1-3.
Hassett, M. E., Reynolds, N.-S. and Sandberg, B.,
2018
"The emotions of top managers and key persons in cross-border M&As: Evidence from a longitudinal case study", 27:737-754.
Holloman R. C.,
1992
"Using both head and heart in managerial decision making." Industrial Management, nov/dec:7-11.

Jennings, D., Wattam, S.,
1998
“Decision making: an integrade approach." Pitman Pub, Financial Times and Prentince Hall, 1998: 1-26.
Lakomski, G., Evers, C. W.,
2010
“Passionate rationalism: the role of emotions in decision making." Journal of Educational Administration, vol. 48,.4:438-450.
Matzler, K., Uzeleac, B., Bauer, F.,
2014
“Intuition:the missing ingredient for good manageial decision-making." Journal of Business Strategy, vol.35, 6:31-40.
Melé, D.,
2010
“Practical wisdom in managerial decision making." Journal of Management Development, vol.29, 7/8:.637;
Natale, S. M., Libertella, A. F., Rothschild, B. M.,
1995
“Decision-making process: the key to quality decision." American Jorunal of Management Development, 4:5-6.
Pavic, I.,
2008
“Nature of managerial decision making along the continuum of the decision making pyramid.", Cambridge:The business review, 2:199-206;
Petrescu, I.,
1998
“Psihosociologie managerială." Brasov:Lux Libris.
Rita, J.W.,
1980
“College Administrators’ Handbook." Boston: Allyn and Bacon Inc.
Samson, D.,
1988
“Managerial decision analysis." Univerity of Melbourne, IllionsHomewood.
Sayegh, L., Anthony, W. P. and Perrewé, P. P.
2004
"Managerial decision-making under crisis: The role of emotion in an intuitive decision process.” Human Resorce Management Review, 14:179-199.
Stan, S. O.,
2012
"Fundamente logice ale deciziei manageriale." http://www.unibuc.ro/studies/Doctorate2013Februarie;
Stewart, T.,
1996
"Relationships between data envelopment analysis and multicriteria decision analysis." The Journal of the Operational Research Society, 47(5):654-665.
Vanharanta, M., and Easton G.
2010
"Intuitive managerial thinking; the use of mental simulations in the industrial marketing context." Industrial Marketing Management, 39: 425-436.
Wen, L. and Zhou, H.,
2009
"Ability, Openness and Managerial Decision Making.” Atlantic Economic Journal 37:197-208.
Wittmer, D.,
1992
"Ethical sensitivity and managerial decision making: an experiment." Journal of Public Administration Research and Theory, 2:443-462.

ELIMINATING THE LIMITS IN DECISION MAKING USING THE ADVANTAGES OF MEDIATION AS AN ALTERNATIVE WAY TO RESOLVE CONFLICTS

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Abstract

Purpose – Innovation in management *by identifying conflict sources and treating them using the advantages of mediation as an alternative way of extinguishing them, in order to sustain a successful management.*

Methodology/Approach - *I used empirical, qualitative, thematic, descriptive research to analyze ways to improve management performance by resolving conflicts using the benefits of mediation.*

Findings *– One of the causes that influence the achievement of an efficient management is determined by the ability to understand the real cause of a conflict, and the ability to communicate effectively with other stakeholders.*

Research limitations/Implications *– The multitude of causes that generate conflicting states and that can cause confusion in their correct determination.*

Practical Implications leaders of organizations *– The unfavorable effects of conflicts arising from ignorance have been taken into account. The authors analyzed different information, emphasizing the results obtained in previous periods in order to increase performance.*

Originality / value - *Identifying the variables that influence, favorably or unfavorably, the results obtained through performance management and finding ways to minimize potential negative influences using the benefits of mediation. We focused on the conflict born of ignorance as a factor influencing management performance.*

Key words: *Performance management, conflict, efficient management*

Introduction

Given that companies' competition has increased greatly, a new approach to management performance is needed. In any field, performance is very important. Performance management includes measures taken to improve the performance of employees and the entire business. There are a number of internal and external factors that can affect positively or negatively the results of an organization. One of these factors is the conflict that we encounter in everyday life, in our personal life and in the organizational environment. Although only the negative role of the conflict is perceived, in reality, it can have both a positive and a negative role. Conflict can be a way for the individual to overcome their own barriers, both personally and professionally. In order to be able to deal with a conflict, it must first be traced.

The work focuses on increasing management performance by treating conflicts using the benefits of mediation, while maximizing performance gains. Performance management is one of the most important aspects of human resources. More and more fierce competition forces companies to compete in parallel with creating a performance-oriented organizational culture.

LITERATURE REVIEW

Everyday we have to make decisions. In the present paper I analyzed and determined the potential conflicting states with negative effects on the results that can occur in the decision making process. I have consulted the scientific literature on the original papers with theoretical and empirical evidence regarding management and human resources in order to find ways to increase performance in management, a basic condition for increasing the efficiency and effectiveness of the organization and performance management.

Spata (2003) considers that the importance of representativeness depends on the research objectives. If research aims to describe the characteristics of the population, representativeness is very important. But if the purpose is to test the relationship between variables or hypotheses derived from different theories, then representativeness is less pressing. In their turn, Sackett and Larson (1990) consider that the need for generalization of results and, implicitly, representation is not so important when the only objective of research is to test a theory. The requirement of representativeness is also less acute when the researcher wishes to know whether a certain effect may occur in a particular situation.

Irving Janis defines Groupthink term as the “deterioration of mental efficiency, reality testing, and moral judgment resulting from ingroup pressure” (Victims of Groupthink, 1972). Applying the strategic performance management development cycle makes it possible for an organization to create in a short time period a new PMS, which will then improve the organization's results dramatically (Waal, 2007). Maurice Atkinson contributed to the debate on performance management by outlining a mechanism by which a performance management framework can be utilised in practice to fundamentally challenge the organisation and provide a platform for action and improvement (2007). The past obsession with pure financial performance is decreasing and there may be a recognition that there is a trade off between hitting today’s financial results and sustaining the capabilities and competences that allow companies to compete effectively in the future (Bourne, Franco, Wilkes, 2003). A positive relation between Corporate Social Responsability and employee performance, suggest that employees in socially responsible companies generate better operating performance than their peers in less socially responsible companies (Sun, Robert Yu,2015). Organizational behavior modification, the management principles, and the management process combine to improve organizational commitment and job satisfaction; organizational commitment and job satisfaction combine to improve employee engagement and workplace optimism; and employee engagement and workplace optimism combine to enhance individual performance (Medlin, Green, Wright, 2016). Effective leadership stands as the bedrock of the elevated trust, the successful knowledge management processes and the enhanced organizational performance (Koohang, Paliszkiewicz, Goluchowski, 2016). The effect of Knowledge Sharing on firm performance is mediated by Intellectual Capital. Explicit Knowledge Sharing has a greater effect on financial performance than operational performance, whereas tacit Knowledge Sharing has a greater impact on operational performance than financial performance (Wang, Wang, Liang, 2014).

I selected and interpreted the information in the literature in conjunction with the current research objectives to justify an innovative approach. The review of empirical research shows that research allows mediation as a solution to resolve conflicts, but does not focus on how to implement this procedure. I have highlighted the changes required by this procedure so that it can be used successfully in solving the conflicts that arise in the stages of the decision-making process. This paper opens new research topics on solving other causes of the conflict, namely on the stages of the decision-making process.

Research method

I used the type of empirical, qualitative research, making a thematic analysis on the topic of how to form an opinion, namely to make a decision. I used qualitative, descriptive research to understand the human factor behaviour in setting an opinion with certainty.

The Questionnaire

I used the questionnaire as a method of scientific research. I collected the data from primary sources using the technique of the questionnaire. I chose the face-to-face approach as the most appropriate way to fill in the questionnaire at the expense of:

- the internet method because the subjects could have been informed from the online environment;
- the phone method because I would have risked a large number of denials;
- by post due to higher costs, high number of refusals, incomplete information regarding subjects' studies.

I used open questions to ensure a variety of responses. I used the face-to-face method of completing the questionnaire in order to give the respondents additional clarification in order to get a better understanding of the subject, respectively for the latter not to be able to write the answers.

The purpose of the research will be to determine whether a person can form an opinion, make a decision, or decide on an issue without having sufficient information, without having the necessary experience or without understanding the phenomenon. Ignoring these 3 elements can trigger a conflict generator, a potential generator of incompatible states with other individuals, given ambiguous opinions.

To simplify the survey, a questionnaire (Figure 1) with two open questions was used:

Please specify the result of the 1 + 1 arithmetic operation

Are you convinced that there is no other result for arithmetic operation? If the answer is no, please specify the result.

QUESTIONNAIRE

My name is Cristian Carol Lang. and I am a PhD student at the Faculty of Machine Building of the Technical University of Cluj-Napoca. I would like to ask you some questions that will help me in making a study on how to form an opinion, namely decision-making.
Please give me a few minutes, with the related excuses and thanking you for your willingness to answer the questions of this questionnaire.

1 Are you a graduate of any higher education institution?
a) Yes
b) Do not (it ends)

2.Please specify the result of the following arithmetic operation:
1 + 1 =

3. Are you convinced (a) that there is no other result for the arithmetic operation in point 2?
a) Yes □
b) No □ - Please specify the result

4. Do you want to make additions in the numbering base 2?
a) Yes □
b) No □

Thank you for collaboration.

Figure 1. The Questionnaire

The requirement of representativeness is less important when the researcher wishes to find out whether a certain effect may occur in a particular situation (Sackett & Larson, 1990). The purpose of the research allowed the choice of a random sample of 1000 people with higher education. The questionnaire requires a maximum of 5 minutes to complete. In order to avoid a large number of refusals, the questionnaire contains few questions and the degree of difficulty is relatively low.

Results, conclusions and interpretations

The result of the survey was as follows:

a) all subjects have specified that the result of the arithmetic operation is 2;
b) 962 people considered the only result that can be 2;
c) 14 people considered that there could still be another result without being able to specify which;
d) 24 persons considered there may be another result specifying that it is "10", being the result of the addition in the numerical base 2;
e) 32 people have specified that they are able to carry out additions in the numerical base 2.

It is not important in this paper to have a quantitative analysis showing the frequency of men and women, division by age, etc., which responded in a certain way. This may be the theme for future research. The purpose of this research is to know the fan of answers, behaviours, attitudes, reactions and not to determine their frequency. The importance of our research is the following: a significant number of the studied sample, without having the necessary information, without having the necessary training, formulates an opinion with conviction.

Aspects regarding the decision-making process

In his work, “Managing for Business Effectiveness” (Harvard Business Review,1963), Peter F. Drucker said:

“There is surely nothing quite so useless as doing with great efficiency what should not be done at all.”

In the specialty literature it is stated that the stages of the decision-making process are the following:

1. Identify the problem
2. Identify alternatives
3. Evaluation of alternatives
4. Selection of alternatives (solution determination)
5. Implementing the decision
6. Tracking and evaluation of the results.

Conclusions and interpretations

Starting from Peter Drucker's statement in paragraph 4, corroborated with the stages of the decision-making process, in the current period, we believe that an update is needed, applicable to both individual decisions and group decisions. Consequently, starting from an efficient performance management, we say it is extremely damaging:

a) to work efficiently for a mistaken target;
b) to work efficiently for a correctly set objective using a wrong alternative;
c) to work efficiently to achieve an objective using a wrong method for implementing the decision;

These statements also result in a close link between performance management, leadership attributes, and performance management, the most important process of human resource involvement.

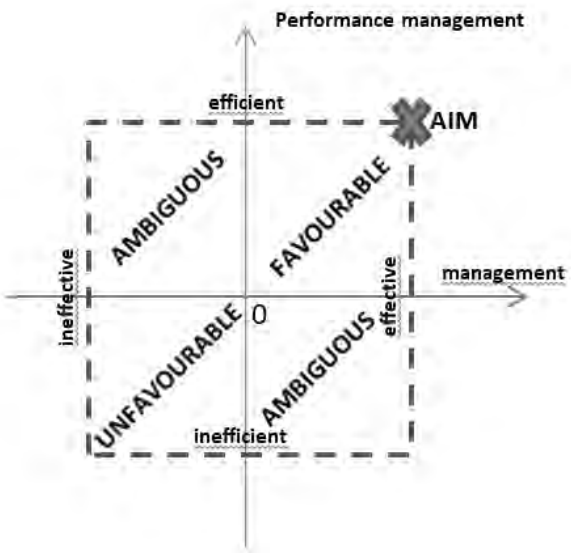

Figure 2. Delimitation of result zones according to the correlation between management and performance management

We can conclude as follows:

An efficient performance management can be nothing more than a useless resource consumer without efficient management, as performance management is inefficient without efficient performance management.

Solving organizational conflicts

In an organization, the activity is also influenced by the existence of a conflicting environment. Our research only refers to the dysfunctional conflict that may have negative effects on the organization.

Figure 3. The emergence of conflicting states influenced by the understanding of the information and the pursued aim

Mediation

We emphasize the importance of using mediation as a way of settling disputes amicably, with a third party that will respect the principles of neutrality, impartiality, confidentiality, mediation information, and help the parties find a solution that is unanimously accepted. According to the specialty literature, respecting the principle of self-determination of the parties, they decide whether they will solve their conflict through mediation. They are the ones who choose the mediator. Throughout the mediation process, the parties, on the basis of the information they hold, will try on their own initiative and will to formulate a unanimously accepted solution.

The use of the standard mediation procedure in the conflicts arising in the decision-making process is not possible without an innovation of the procedure as the following changes occur:

a) The need for good information of the parties to avoid confusion over the cause of the conflict;
b) The interest of the parties to the conflict is the same, namely it is the interest of the organization;
c) Orientation of the parties' behaviour towards listening and reasoned acceptance, which will also lead to the avoidance of initiative and entrepreneurial spirit.

By reasoning, we justify an affirmation, an opinion, a decision trying to convince or convince ourselves that we are right about the justice of the expressed opinion, respectively that of the decision taken. In the decision-making process, the paradox consists in solving through a mediation procedure a triggered conflict between the parties that have theoretically the same interest, namely the interest of the organization in achieving the proposed objective.

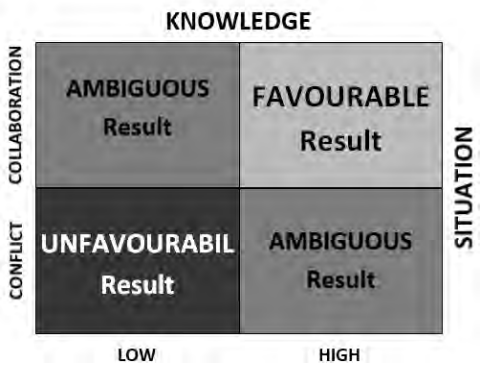

Figure 4. Dependence of results STUATION and KNOWLEDGE

The principle of 3I

Efficiency management is one of the most important aspects of human resources, which is subordinated to effective management, opens the way for a competitive advantage. In real life, we make various statements with conviction, ignoring from ignorance many variables that decide whether these statements are true or not. It is extremely useful to realize that even if we believe that an affirmation is correct, we must have a shadow of doubt and have the power to accept that there may be other opinions that may prove even more documented.

As steps to solve the conflict through the mediation procedure, we propose the principle of those 3I (I.I.I.):

a) **Identifying** the conflict and the cause of its occurrence;
b) **Information** (Theoretical and Practical) of the parties regarding the information held related to the proposed objectives;
c) **Instruction** (not an influence on the parties' interest) towards a healthy behaviour of all parties by realizing that we do not always have the truth and have the obligation to respect, listen, analyze and accept opinions from others.

Practice has shown that correct and complete information can eliminate the conflict without any other intervention. We have achieved the solution to the conflict caused by ignorance, in any of the stages, by applying the principle of the 3I, starting from a correct identification of the conflict, a correct and complete information of the parties, their orientation by the mediator towards finding a solutions unanimously accepted in the interest of the organization by influencing a civilized behavior based on listening to all reasoned opinions.

Discussion and conclusions

The paper seeks to build a competitive advantage by innovating in management identifying the sources of conflict that can occur in the decision making process and minimizing the negative effects by using the benefits of mediation. We are proposing a new approach to ways to increase efficiency in management through conflict detection and management. Effective management is a basic condition for increasing the efficiency and effectiveness of the organization and efficient management. There are a multitude of types of conflicts that can occur within an organization. The accumulated information, the acquired experience, the theoretical or practical understanding, or brief knowledge, is the leverage of success in all areas. Issuing decisions in the context of a conflict state due to the partial understanding of the data and the context of the objective pursued is the starting point for the research conducted in the paper. This finding imposes the issue of conflict study and management within the organization. The focus on performance management has become a priority for professionals.

Research has shown the importance of improving the results obtained by a firm as an important element in ensuring lasting success by increasing individual and organizational performance coupled with efficient management. In this respect, we emphasized keeping under observation of both personal and organizational conflicts in order to minimize the negative influences on performance management.

Notes

The eradication of the conflict is almost impossible and not always desirable for an organization. That is why we did not propose to find ways to eliminate conflicts, but to find ways to resolve conflicts in a manner conducive to increasing the company's performance. Adopting actions to prevent the conflict does not imply implicitly that they will lead to the definitive elimination of problems in the organization. In this respect, the various problems faced by a firm, implicitly the various forms of conflict, are a natural part of organizational life.

References

Irving Janis
1972
“Victims of Groupthink”, Houghton Mifflin, Boston
Bontis Nick
2000
Assessing Knowledge Assets: A Review of the Models Used to Measure Intellectual Capital
André A. de Waal
2007
“Successful performance management? Apply the strategic performance management development cycle!”, Published by Emerald Group Publishing Limited
Maurice Atkinson
2012
“Developing and using a performance management framework: a case study”, Published by Emerald Group Publishing Limited
Mike Bourne, Monica Franco, John Wilkes
2003
"Corporate performance management", Measuring Business Excellence, Vol. 7 Issue: 3, pp.15-21, Published by MCB UP Ltd

Li Sun, T. Robert Yu,
2015
"The impact of corporate social responsibility on employee performance and cost", Review of Accounting and Finance, Vol. 14 Issue: 3, pp.262-284, Published by Emerald Group Publishing Limited
Bobby Medlin, Kenneth W. Green, Alan D. Wright
2016
"Comprehensive management practices and policies performance model", Industrial Management & Data Systems, Vol. 116 Issue: 5, pp.1043-1060, Published by Emerald Group Publishing Limited
Alex Koohang, Joanna Paliszkiewicz, Jerzy Goluchowski
2016
“The impact of leadership on trust, knowledge management, and organizational performance: A research model, Industrial Management & Data Systems”, Volume: 117 Issue: 3, Published by Emerald Group Publishing Limited
Peter F. Drucker
1963
“Managing for Business Effectiveness”, Harvard Business Review, Harvard Business Publishing, Boston, Massachusetts
Zhining Wang, Nianxin Wang, Huigang Liang
2014
“ Knowledge sharing, intellectual capital and firm performance”, Management Decision, Volume: 52 Issue: 2, pp.230-258, Published by Emerald Group Publishing Limited
Andrea V. Spata
2003
Research Method in Psychology: Science and Diversity, Publisher John Wiley&Sons, Inc.
Sackett, P. R., & Larson Jr., J. R.
1990
Research Strategies and Tactics in Industrial and Organizational Psychology. In M. D. Dunnette & L. M. Hough (Eds.), Handbook of Industrial and Organizational Psychology (Vol. 1, pp. 419-489). Palo Alto, CA: Consulting Psychologists Press, Inc.

ASSISTED ANALYSIS OF SOME SPECIAL CASES OF THE TRANSPORTATION PROBLEM

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Abstract

Purpose *– The analysis and efficient resolution of some special cases of the Transportation Problem is the purpose of this paper.*

Methodology/approach *– The theoretical study in the paper starts from the linear programming formulation of the mathematical model for the typical Transportation Problem.* Taking into account all constraints included in the treated special cases, the mathematical models *become more complex than the model of the typical problem.*

Findings *– The paper proposes a method for solving and analyzing some special cases of the Transportation Problem by reducing to such a typical problem.*

Research limitations/implications *– The proposed method is applicable to a variety of special cases of Transportation Problem, making it easier to solve them.*

Practical implications *– The practical advantage of the method is the possibility to use a method dedicated to the typical problem, with greater efficiency than the simplex algorithm. It can also performs sensitivity and parametric analyzes of the problems, as well as the solving, by means of a dedicated software (WinQSB).*

Originality/value *– The proposed method is a tool available to engineers and managers alike in ensuring their operations are conducted effectively and efficiently at the lowest transportation cost possible and consequently maximize their profit.*

Key words: *Transportation Problem, optimal solution, WinQSB.*

Introduction

A Performance Management involves the regular application of scientific method to the management of organized systems in business, industry, for providing goods or services. This application deals with decisions involved in planning the efficient allocation of resources to achieve stated goals and objectives. Management Performance assumes the application of scientific methods, techniques and tools to problems involving the operations of a system so as to provide those in the control of the system with optimum results in accordance with the overall objectives and constraints of the organization. The theme approached in this paper is important, and it concerns the managers from different hierarchical levels of organizations across industries and business.

Transportation Problem is one of the most important application of quantitative analysis due to its spreading in real life. In today competitive market, various organizations want to deliver products to the customers in a cost effective way, so that the market becomes competitive (Sharma, Abbas and Gupta, 2012). Effective and efficient movement of products or services from origins of supply to destinations of demand is crucial for any businesses (Ghazali, Majid and Shazwani, 2012).

The choice of the quantity to be supplied, the location to be delivered and the right and most economical means of transportation are widely referred to as Transportation Problem (Reeb, and Leavengood, 2002). The problem involves finding the lowest-cost plan for distributing stocks of goods or *supply* from multiple origins to multiple destinations that *demand* the goods (Lawrence and

Pasternack, 1998). Usually, analysis of the problem will produce a shipping plan that pertains to a certain period of time (day, week), although once the plan is established, it will generally not change unless one or more of the parameters of the problem (supply, demand, unit shipping cost) changes (Ahmed et al., 2016).

The transportation model can be extended to areas other than the physical distribution of goods, including among others, inventory control, employment scheduling, and personnel assignment.

In this paper, a method, with greater efficiency than the simplex algorithm, is proposed to find the optimal solution for certain special cases of Transportation Problem. Finally, the method is illustrated with a numerical case study.

Typical Transportation Problem

In general, a typical Transportation Problem is specified through a set of information as follows.

A set of sources S_i (i = 1,..., m) from which a good is shipped. Source S_i can supply at most a_i units. A set of destinations D_j (j = 1,..., n) to which the good is shipped. Destination D_j must receive at least b_j units of the shipped good. The unit cost of shipping from source S_i to destination D_j is c_{ij}. The cost of shipping is directly proportional to the number of units shipped. The objective is to determine the amounts shipped from each source to each destination that minimize the total shipping cost while satisfying both the supply limits and the demand requirements.

Let the decision variables of the problem x_{ij} (i = 1,..., m; j = 1,..., n), the number of units shipped from source S_i to destination D_j.

Considering the above notations, the linear programming formulation of the general mathematical model of a typical Transportation Problem is (Hillier and Lieberman, 2015):

$$\text{Minimize}: \quad z = \sum_{i=1}^{m}\sum_{j=1}^{n} c_{ij}x_{ij}$$

$$\text{Subject to}: \quad \sum_{j=1}^{n} x_{ij} \le a_i, \ i = 1,2,...,m \quad \text{(Supply constraints)}$$

$$\sum_{i=1}^{m} x_{ij} \ge b_j, \ j = 1,2,...,n \quad \text{(Demand constraints)}$$

$$x_{ij} \ge 0, \quad i = 1,2,...,m; j = 1,2,...,n$$

If

$$\sum_{i=1}^{m} a_i = \sum_{j=1}^{n} b_j$$

then the total supply equals total demand, and the problem is said to be a balanced transportation problem.

For a balanced transportation problem, in the standard formulation of the mathematical model, the constraints become:

$$\sum_{j=1}^{n} x_{ij} = a_i, \ i = 1,2,...,m \quad \text{(Supply constraints)}$$

$$\sum_{i=1}^{m} x_{ij} = b_j, \ j = 1,2,...,n \quad \text{(Demand constraints)}$$

A typical Transportation Problem can be described completely in terms of a transportation problem table that identifies all the sources, destinations, supplies, demands and units costs:

Table 1. A Transportation Problem table

	D_1	D_2	. . .	D_n	Supply
S_1	c_{11}	c_{12}	. . .	c_{1n}	a_1
S_2	c_{21}	c_{22}	. . .	c_{2n}	a_2
⋮	⋮	⋮	. . .	⋮	⋮
S_m	c_{m1}	c_{m2}	. . .	c_{mn}	a_m
Demand	b_1	b_2	. . .	b_n	

The network representation for a Transportation Problem (Bernot, Caselles and Morel, 2009) is given in Fig.1.

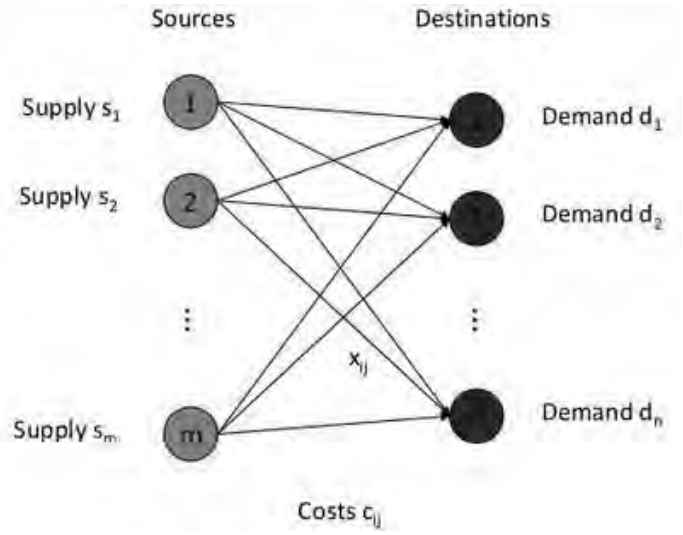


Figure 1. The network representation for a Transportation Problem

Use of the transportation model implies that certain assumptions are satisfied:

- the items to be shipped are homogeneous (i.e. they are the same regardless of their source or destination);
- shipping cost per unit is the same regardless of the number of units shipped;
- there is only one route or mode of transportation being used between each origin and each destination.

The Transportation Problem can be solved using the simplex method as with any Linear Programming problem. However, the special structure of the mathematical model allows us to solve it with a faster, more economical method than simplex.

The specific technique for solving a Transportation Problem consists in these major steps (Taha, 2016):

1. Obtaining an initial solution.
2. Testing the solution for optimality.
3. Improving sub optimal solutions.

Special cases of Transportation Problem

The special cases of Transportation Problem, studied in this paper, include the following additional constraints in relation to a typical Transportation Problem:

- unbalanced problem, with total supply > total demand;
- unacceptable routes;

- imposed shipping for some selected routes;
- minimum shipping guarantees from certain specified sources.

Obviously the mathematical models associated with such problems are Linear Programming models, but more complex than the mathematical model of a typical Transportation Problem. Thus the use of the simplex algorithm for solving is even less recommended than in a typical problem.

The above additional constraints can be dealt with as follows.

For an unacceptable route, from source S_i to destination D_j, it is removed the corresponding decision variable x_{ij} from the model, and the cost c_{ij} gets a very large positive value M.

For an imposed shipping x_{kt} for a selected route, from source S_k to destination D_t, it can be assumed that the shipping x_{kt} is transported in advance, and the remaining transportation problem is a typical one.

For an unbalanced problem, with total supply > total demand, and minimum shipping guarantees q units of good from the specified source S_l, it is necessary to introduce a dummy destination (for balance), and to split the source S_l in two other centers S_{l1} and S_{l2}. S_{l1} will have a supply equal with q units, and a unit cost to dummy destination equal with M. S_{l2} will have a supply equal with the difference $(a_l - q)$ units, and a unit cost to dummy destination equal with zero.

By applying the above transformations a Transportation Problem, hereinafter referred to as an auxiliary problem, is obtained.

Therefore, the steps of the proposed method for solving and analyzing the treated special cases of the Transportation Problem are the following:

1. Define the objective function to be minimized with the all constraints imposed on the initial problem.
2. Set up a transportation table with rows representing the sources and columns representing the destinations for the auxiliary obtained problem.
3. Finding the optimal solution and the optimal value of the objective function for the auxiliary problem, with the specific methods of the typical Transportation Problem.
4. Calculate the solution and the value of the objective function for the initial problem.
5. Perform the sensitivity analysis of the solution and develop the economic interpretation of the results.
6. Perform the parametric analyses relative to the different coefficients of the problem and develop the economic interpretation of the results.

A numerical case study

Consider the following transportation problem involving three sources and four destinations.

A company has three factories *A*, *B*, *C*, producing a certain product that is to be shipped to four warehouses *D*, *E*, *F*, *G*. Shipments are made once per week and the unit production costs are the same at the three factories. During each week, the available quantities from factories, the required quantities at the warehouses are shown in the Table 2 below. The shipping cost per unit from factories to warehouses are also included in the table.

Table 2. Data of the numerical case study

		Warehouse				
		D	*E*	*F*	*G*	Supply
Factory	*A*	4	5	7	3	350
	B	6	8	-	4	200
	C	7	4	6	5	450
	Demand	180	260	270	250	

The route *B* to *F* is unacceptable. A shipping x_{CD} = 70 units of product is imposed from *C* to *D*. A minimum shipping 170 units of product is guaranteed from factory *B*.

a) Determining the optimum mode of transport to minimize the total cost of distributing the units of product.
b) Determining the range of optimality.
c) Determining the range of feasibility.
d) Performing the parametric analysis relative to the available quantity of the factory *C* in the range [300, 500] units of product.
e) Performing the parametric analysis relative to the requested quantity of the warehouse *E* in the range [200, 400] units of product.
f) Performing the parametric analysis relative to the shipping cost per unit from the factory *A* to the warehouse *E* in the range [1, 8] monetary units.

The method described above is used to solve this numerical case study.

It is used the following notation: s_i – supply from factory *i* (where *i* = *A*, *B*, *C*); d_j – demand at warehouse *j* (where *j* = *D*, *E*, *F*, *G*); c_{ij} – cost per unit distributed from factory *i* to warehouse *j*; *TC* – total transportation cost; x_{ij} – the number of units to be distributed from factory *i* to warehouse *j*.

a) The total supply is 1000 units, whereas the total demand is 960 units, thus the problem is unbalanced.

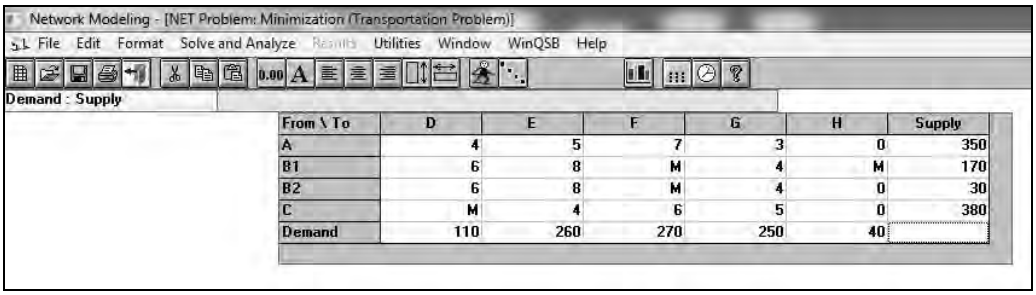
It can be assumed that the imposed shipping x_{CD} = 70 units of product is transported in advance from the factory *C* to warehouse *D*, thus their updated quantities are s_C = 380 units and d_D = 110 units.

The route *B* to *F* is unacceptable, and then the unit cost c_{BF} is very high, c_{BF} = *M*.

Because the total supply > the total demand (the surplus is 40 units), and minimum shipping 170 units of product is guaranteed from factory *B*, it must add a dummy destination (called *H,* with cost coefficients of zero) and the factory *B* is splited into two centers: B_1 with s_{B1} = 170 units and B_2 with s_{B2} = 30 units of product.

Further, the last auxiliary obtained problem is resolved with *WinQSB* software, the module *Network Modeling*, the type *Transportation Problem*.

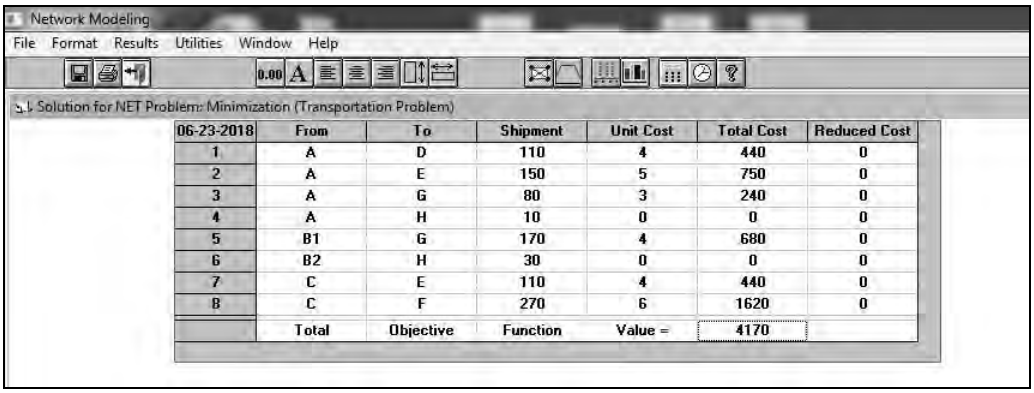
The data of the auxiliary problem in matrix form are presented in the table from Fig. 2.



From \ To	D	E	F	G	H	Supply
A	4	5	7	3	0	350
B1	6	8	M	4	M	170
B2	6	8	M	4	0	30
C	M	4	6	5	0	380
Demand	110	260	270	250	40	

Figure 2. The auxiliary problem data in matrix form

Their optimal solution in matrix form, shown in Fig.3, is obtained with the command *Solve the Problem* from the menu *Solve and Analyze*.



06-23-2018	From	To	Shipment	Unit Cost	Total Cost	Reduced Cost
1	A	D	110	4	440	0
2	A	E	150	5	750	0
3	A	G	80	3	240	0
4	A	H	10	0	0	0
5	B1	G	170	4	680	0
6	B2	H	30	0	0	0
7	C	E	110	4	440	0
8	C	F	270	6	1620	0
	Total	Objective	Function	Value =	4170	

Figure 3. The solution of the auxiliary problem in matrix form

The column *Shipment* in the table in Fig.3 contains the optimal values of the quantities (in units of product) to be shipped in the auxiliary problem: x_{AD} = 110 u.; x_{AE} = 150 u.; x_{AG} = 80 u.; x_{BG} = 170 u.; x_{CE} = 110 u.; x_{CF} = 270 u. It can be noted that factory *A* remains with 10 units of product unshipped, and factory *B* remains with 30 units unshipped, because *H* is a dummy destination. The complete optimal solution to the initial problem also includes the quantity x_{CD} = 70 u.

Therefore, the minimum total cost of the transport for the initial problem is:

$TC = 70 \times 7 + 4170 = 490 + 4170 = 4660$ monetary units.

Figure 4 is a graphical representation of the auxiliary problem and its optimal solution, obtained with the command *Graphic Solution* from the menu *Results*.

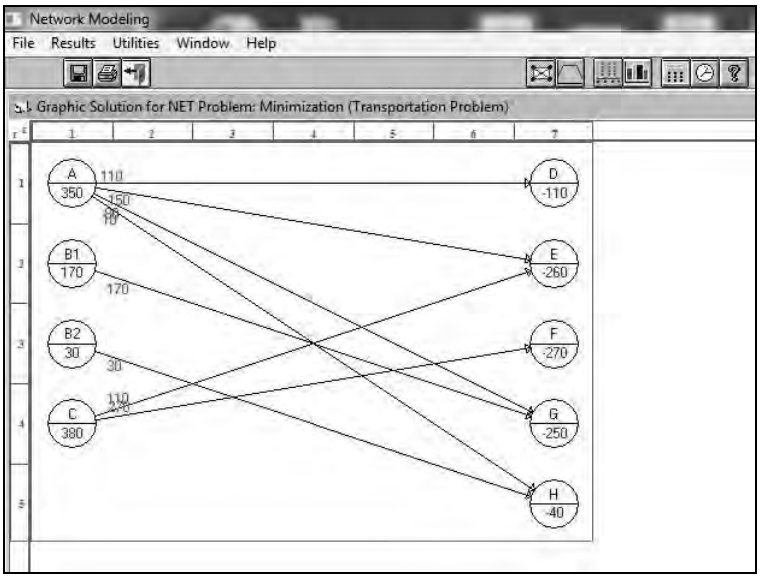
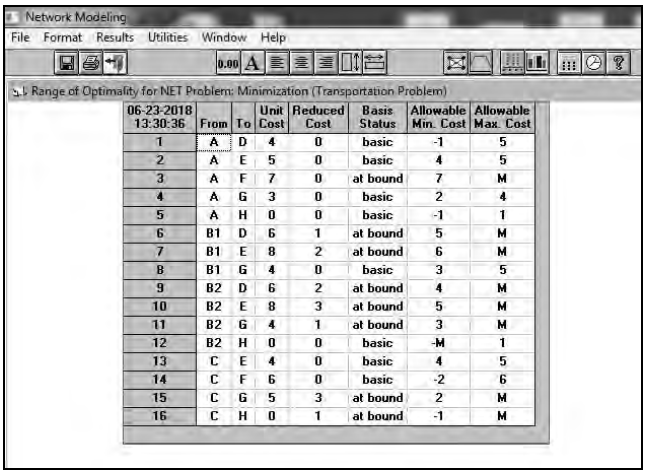


Figure 4. Graphical representation of the auxiliary problem and its optimal solution

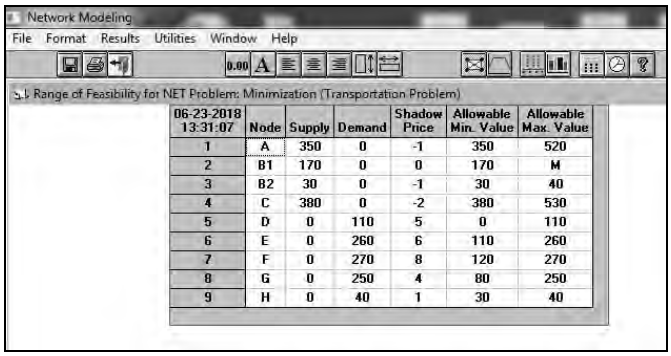
b) The command *Range of Optimality* from the menu *Results* returns the table in the Fig.5 for the auxiliary problem. It provides the range (*Allowable Min* and *Allowable max*) that the coefficients in objective function (unit cost of shipment) can change and still have the same solution (x_{ij}), but with different minimum total cost.



06-23-2018 13:30:36	From	To	Unit Cost	Reduced Cost	Basis Status	Allowable Min. Cost	Allowable Max. Cost
1	A	D	4	0	basic	-1	5
2	A	E	5	0	basic	4	5
3	A	F	7	0	at bound	7	M
4	A	G	3	0	basic	2	4
5	A	H	0	0	basic	-1	1
6	B1	D	6	1	at bound	5	M
7	B1	E	8	2	at bound	6	M
8	B1	G	4	0	basic	3	5
9	B2	D	6	2	at bound	4	M
10	B2	E	8	3	at bound	5	M
11	B2	G	4	1	at bound	3	M
12	B2	H	0	0	basic	-M	1
13	C	E	4	0	basic	4	5
14	C	F	6	0	basic	-2	6
15	C	G	5	3	at bound	2	M
16	C	H	0	1	at bound	-1	M

Figure 5. Table returned by the command Range of Optimality

c) The command *Range of Feasibility* from the menu *Results* returns the table in the Fig.6. for the auxiliary problem. It provides the range (*Allowable Min* and *Allowable max*) that the capacities of supply and demand points can change and still have the same basis (ship from one node to the other) but with different amount of shipment and minimum cost.



06-23-2018 13:31:07	Node	Supply	Demand	Shadow Price	Allowable Min. Value	Allowable Max. Value
1	A	350	0	-1	350	520
2	B1	170	0	0	170	M
3	B2	30	0	-1	30	40
4	C	380	0	-2	380	530
5	D	0	110	5	0	110
6	E	0	260	6	110	260
7	F	0	270	8	120	270
8	G	0	250	4	80	250
9	H	0	40	1	30	40

Figure 6. Table returned by the command Range of Feasibility

d) The command *Perform Parametric Analysis* from the menu *Solve and Analyze* is used for the parametric analysis relative to the available quantity $s_C \in [300, 500]$ units, in the auxiliary problem. After filling of the dialog box *Parameter Analysis* in a manner presented in Fig.7, the software provides the results in matrix form (Fig.8) and in graphic form (Fig.9).

For the initial problem: $TC \in [3690 + 490, 4170 + 490]$ monetary units.

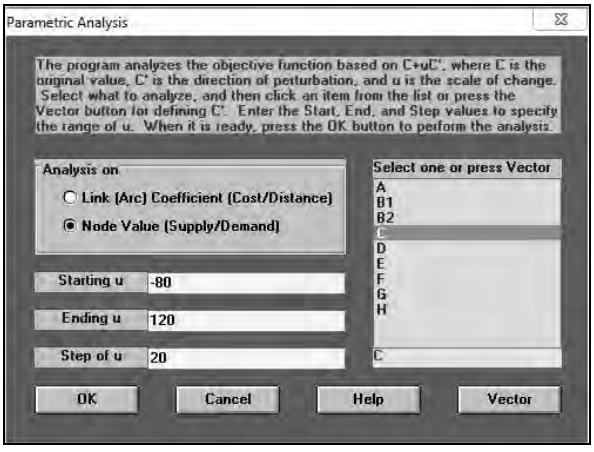
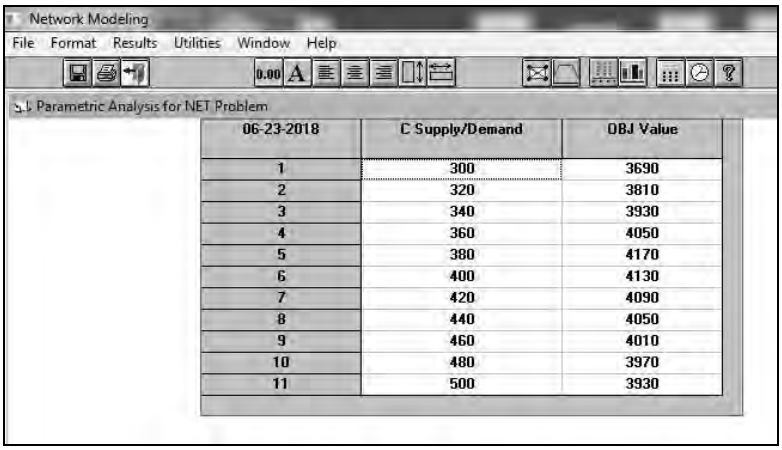


Figure 7. The dialog box *Parametric Analysis* for $s_C \in [300, 500]$



06-23-2018	C Supply/Demand	OBJ Value
1	300	3690
2	320	3810
3	340	3930
4	360	4050
5	380	4170
6	400	4130
7	420	4090
8	440	4050
9	460	4010
10	480	3970
11	500	3930

Figure 8. Results of the parametric analysis for $s_C \in [300, 500]$, in matrix form

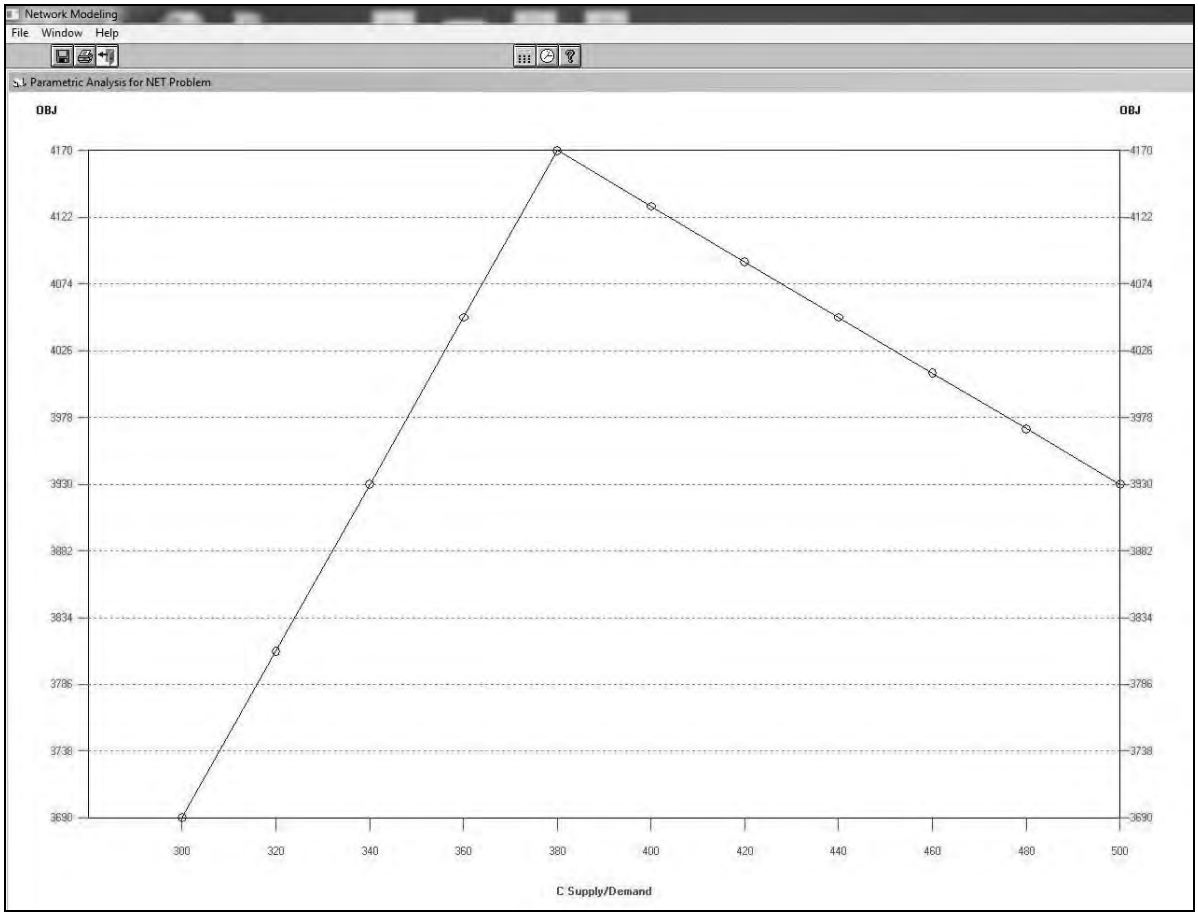


Figure 9. Results of the parametric analysis for $s_C \in [300, 500]$, in graphic form

e) The parametric analysis relative to the requested quantity $d_E \in [200, 400]$ units, in the auxiliary problem, has the dialog box and the results presented in Fig.10-12.

For the initial problem: $TC \in [3810 + 490, 4170 + 490]$ monetary units.

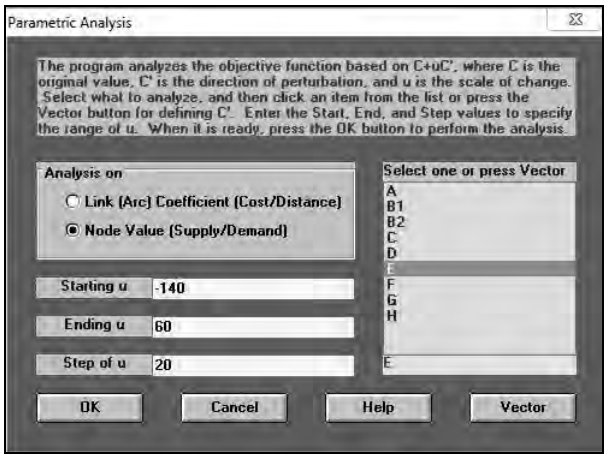
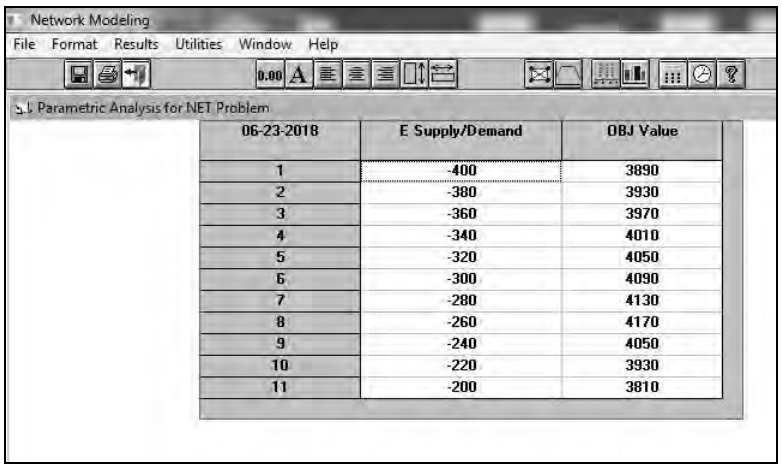


Figure 10. The dialog box *Parametric Analysis* for $d_E \in [200, 400]$



06-23-2018	E Supply/Demand	OBJ Value
1	-400	3890
2	-380	3930
3	-360	3970
4	-340	4010
5	-320	4050
6	-300	4090
7	-280	4130
8	-260	4170
9	-240	4050
10	-220	3930
11	-200	3810

Figure 11. Results of the parametric analysis for $d_E \in [200, 400]$, in matrix form

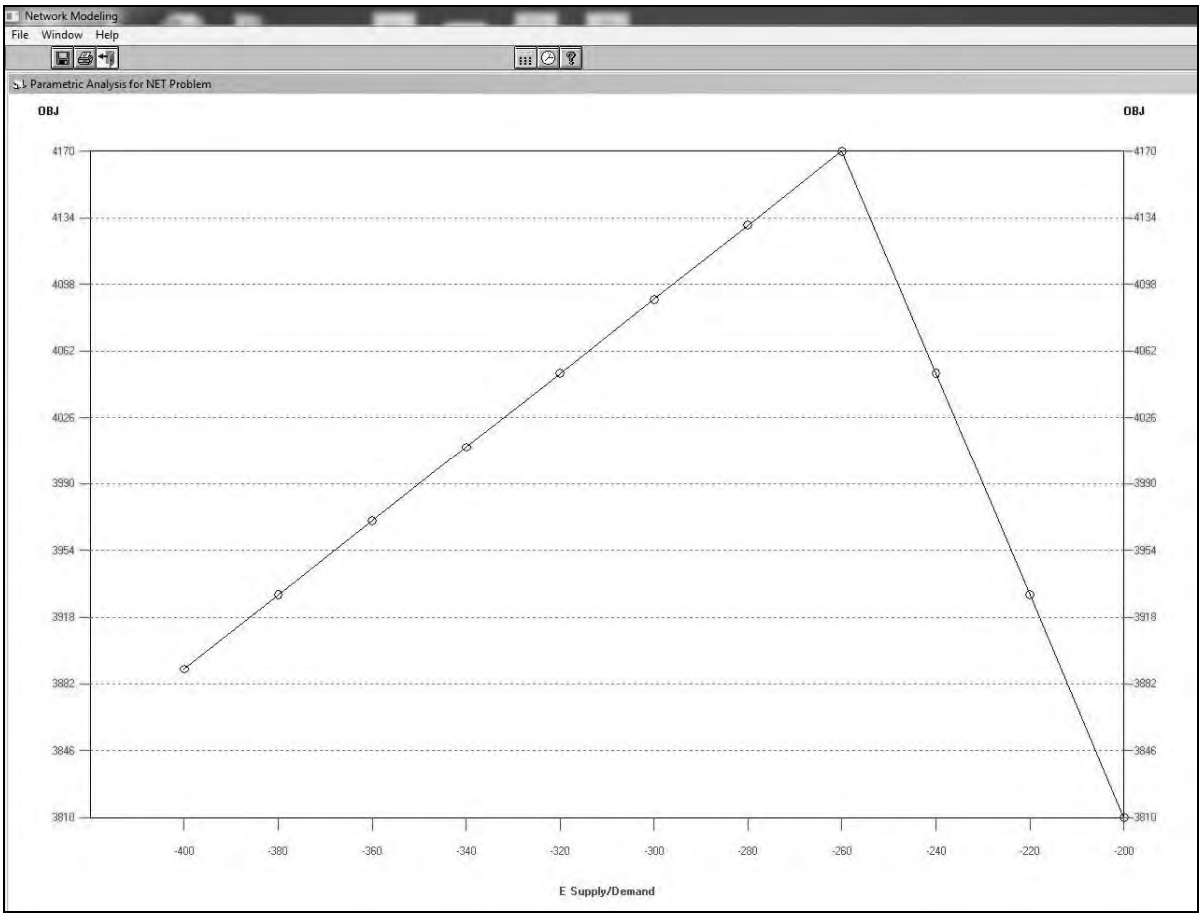


Figure 12. Results of the parametric analysis for $d_E \in [200, 400]$, in graphic form

f) The parametric analysis relative to the shipping cost $c_{AE} \in [1, 8]$ monetary units has the dialog box and the results presented in Fig.13-15.

For the initial problem: $TC \in [3430 + 490, 4170 + 490]$ monetary units. It is found that for $c_{AE} \geq 5$ monetary units, the route *A-E* is no longer part of the optimal solution.

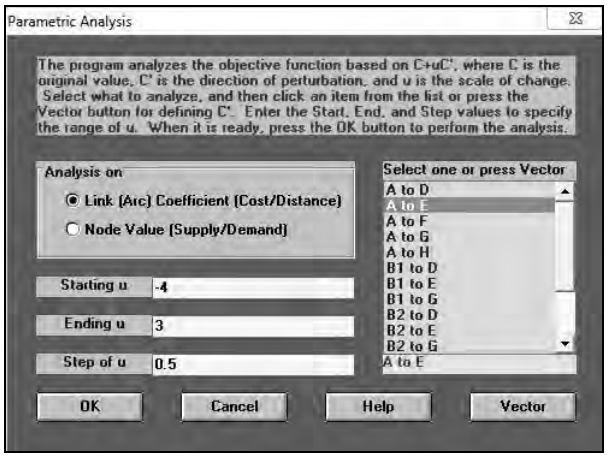
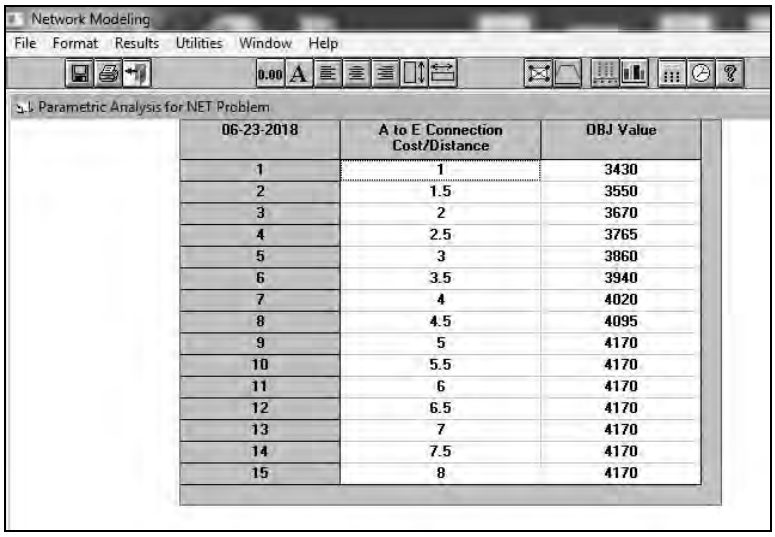


Figure 13. The dialog box *Parametric Analysis* for $c_{AE} \in [1, 8]$



06-23-2018	A to E Connection Cost/Distance	OBJ Value
1	1	3430
2	1.5	3550
3	2	3670
4	2.5	3765
5	3	3860
6	3.5	3940
7	4	4020
8	4.5	4095
9	5	4170
10	5.5	4170
11	6	4170
12	6.5	4170
13	7	4170
14	7.5	4170
15	8	4170

Figure 14. Results of the parametric analysis for $c_{AE} \in [1, 8]$, in matrix form

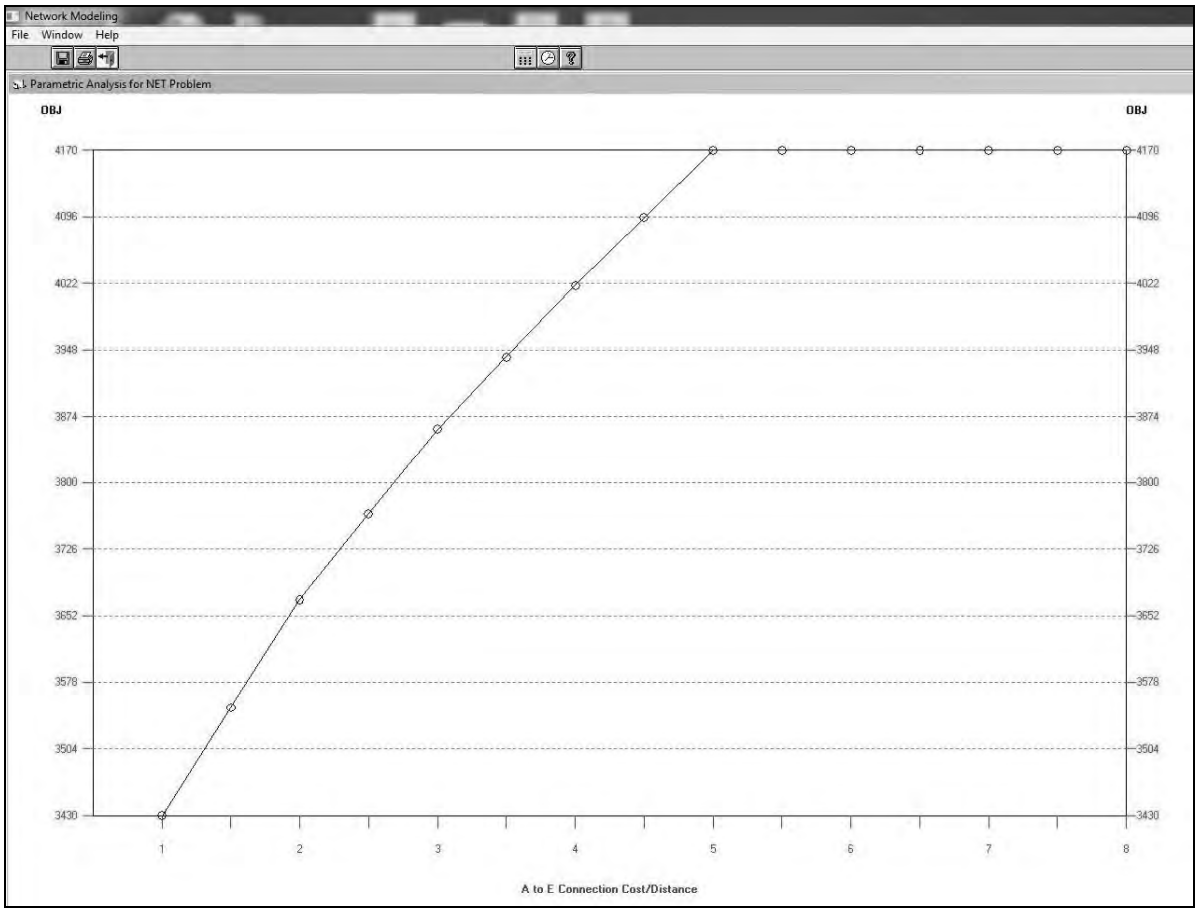


Figure 15. Results of the parametric analysis for $c_{AE} \in [1, 8]$, in graphic form

Discussion and conclusions

In today highly competitive market, various organizations want to deliver products to the customers in a cost effective way, so that the market becomes competitive. To meet this challenge, the transportation model provides powerful framework to determine the best ways to deliver goods to the customer.

In this paper an alternative method to simplex algorithm for solving some special cases of Transportation Problem is proposed. Optimum plan and solution to minimize the total cost of transportation are formulated and analyzed.

The numerical case study is concerned with distribution of a product from factories to warehouses. The objective is to determine the distribution plan that leads to the lowest total shipping cost to the company that is entrusted to deliver the product. It is subjected to more constraints than to a typical Transportation Problem. It also discusses sensitivity technique in analyzing the impact of uncertainty of different main parameters to the total cost of the company.

The proposed method is applicable to a variety of special cases of Transportation Problem, making it easier to solve them. Certainly, the method is a tool available to engineers and managers alike in ensuring their operations are conducted effectively and efficiently at the lowest transportation cost possible and consequently maximize their profit.

References

Ahmed, M. M., A. R. Khan, M. S. Uddin, and F. Ahmed
2016
"A New Approach to Solve Transportation Problems." Open Journal of Optimization, 5: 22-30.

Bernot, M., V. Caselles, and J. M. Morel
2009
Optimal Transportation Networks. Springer-Verlag Berlin Heidelberg.

Ghazali, Z., A. A. Majid, and M. Shazwani
2012
"Optimal Solution of Transportation Problem Using Linear Programming: A Case of a Malaysian Trading Company." Journal of Applied Sciences, 12 (23): 2430-2435.

Hillier, F. S., and G. J. Lieberman
2015
Introduction to Operation Research, 10th Edition. McGraw-Hill, Inc., New York.

Lawrence, J. A., and B. A. Pasternack
1998
Applied Management Science. A Computer Integrated Approach for Decision Making. John Wiley &Sons Inc., New York.

Reeb, J., and S. Leavengood
2002
"Operations Research: Transportation Problem: A Special Case for Linear Programming Problems." Part of the Performance Excellence in the Wood Products Industry EM8779, Oregon State University.

Sharma, G., S. H. Abbas, and V. K. Gupta
2012
"Solving transportation problem with the various method of linear programming problem." In Innovative Journal, Assian Journal of Current Engineering and Maths, 3: 81-83.

Taha, H. A.
2016
Operations Research: An Introduction (10th Edition). Pearson, Prentice Hall, Upper Saddle River.

THE ENTREPRENEURIAL PROJECT- INSTRUMENT FOR MEASURING THE PERFORMANCE OR THE PERFORMANCE OF ECONOMIST ENGINEERS?

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Abstract

Purpose: *The purpose of our work is to help students get ready for the economist engineer profession and help them become familiar, as early as the time spent at university, with the entrepreneur occupation, which is both opportune and necessary in an economy such as that of Romania, defined by some as an emerging economy. The proposed Entrepreneurial Project model is, on the one hand, a tool for measuring the performance of the economist engineer and, on the other hand, on implementation, it represents the performance of the economist engineer in business.*

Methodology/approach: *the case-study strategy.*

Key words: *entrepreneurial project, economist engineer, business plan.*

Introduction

The implementation of the "Secondary Education Project" (ROSE), (Grant Scheme for Universities, Beneficiary: UNIVERSITY OF ORADEA, FACULTY OF ELECTRICAL ENGINEERING AND INFORMATION TECHNOLOGY, Title of the subproject: Laboratory for the EntrepreneurialEducation and Training, Grant Agreement no. 72 / SGU / NC / I),essentially relied on the development of LEFA: the Laboratory for Entrepreneurial Training and Education,where activities aimed at: guidance and support (tutorship), counseling and personal development, coaching, along with designing and simulating entrepreneurship of different kinds (business, social, political, research, nonprofit, intra-entrepreneurial) are carried out, for the benefit of the first-year students, at the Faculty of Electrical Engineering and Information Technology, University of Oradea.

The students taking part to the aforementioned activities will acquire the minimum knowledge that is necessary before starting a business, based on ideas generated by each participant in particular; in order to enable students initiate a form of entrepreneurship in one of the fields specific to their study domain, the implementation team has developed the "Electronic Support (Guidance) Manual" for carrying out the above mentioned activities within the Laboratory of Entrepreneurial Education and Training; in addition, the participants who will finalize a personal ENTREPRENEURIAL Project will obtain a PARTICIPATION CERTIFICATE, confirming their involvement in activities and the fact that they have acquired a minimum of entrepreneurial knowledge.

During the period of time when activities will be carried out within theLaboratory, under the guidance of the GRANT staff members, students will find answers to questions and issues such as: What is Entrepreneurship?How can I start my own business?; Funding, Business Growth Management; LEFA Entrepreneurship Workshops and other activities (guidance and support, counseling and personal development, coaching, and professional development). All activities will be carried out in the LEFA Laboratory.

In the same place, students will have the opportunity to learn about the research (study) method of the CASE STUDY, considered to be the most effective way to design a business (entrepreneurial project) when they have identified a business idea. This method answers questions such as "how" and "why",

on which we shall also focus in the subsequent sections of this study. It should be pointed out here that, from the very first chapter of the project, the CASE STUDY method is going to be used, precisely because we have little control over the events, and our attention is directed to the phenomenon associated with the: "Needs, desires, requirements for automated systems on the market" so that this form of demand can be satisfied by means of "Automatic Systems Marketing" and by "designing an entrepreneurship project in the marketing of automated systems". We use this method because we intend to deal with contextual conditions: "Needs, desires, demand for automated systems on the market" for the purpose of initiating an entrepreneurship (business). Secondly, since phenomenon and context are not always differentiable in real life, we will also use data collection and analysis strategies. The components of the research design are as follows:

In Chapter I of our project we intend to describe the "CASE STUDY" Research Method; the chapter includes the followingsub-chapters: study questions; the study hypothesis; analysis units of the study: ThePrimary Unit: Automated Systems Commerce; the Contextual Analysis Unit –the existence of the case: Needs, Desires, Demand for Automated Systems on the Market; the Embedded Unit: Designing Business Entrepreneurship in Automated Systems Marketing; linking the data to hypotheses; criteria for data interpretation. In chapter I we shall also describe the preliminary theories regarding: "Automated systems marketing", "Needs, desires, demand for automated systems on the market"; Designing business entrepreneurship in the marketing of automated systems.

Chapter II deals with the Collection of Evidence for: "Automated Systems Marketing", "Needs, Desires, Demand for Automated Systems on the Market"; Designing business entrepreneurship in the marketing of automated systems.

Chapter III focuses on Data Analysis, and in the end, after the analysis, the conclusions will be presented.

The last phase will be represented by the simulation of the Project on the hardware and software equipment with which the Laboratory for Entrepreneurial Education and Training has been provided. It also includes the evaluation of the project and the handing of a PARTICIPANT CERTIFICATE to students.

The Research Method

I.1 The study questions

We have set the following study questions:

1. Why could the Marketing of automated systems be regarded as an opportunity (an issue of interest)?
2. How could we identify the Needs, desires and demand for automated systems on the market?
3. How could we achieve the Business Design for the Opportunity of Selling Automated Systems?

I.2 The study hypothesis

The study hypothesis we have established is the following:

If needs are identified: Needs, desires and demand for automated systems on the market, then there is also the opportunity (interest) to solve these needs through the idea of a business: The Marketing of automated systems, Designing a form of entrepreneurship for Automated Systems Marketing.

I.3 The Analysis Units

The analysis unit is related to the fundamental problem of defining the case, i.e. to a phenomenon identified: Needs, desires and demand for automated systems on the market, which cannot be defined as an individual. We are aware that this is a case study on decisions, programs, implementation processes and organizational changes. We are also aware that such topics are not very easy to define with regard to the "beginning" and "end" points of the case. A study on such a topic may reveal: "a) variations in the definition of decisions, programs, implementation processes or organizational

changes, and b) the components that existed before their formal nomination." Therefore, the study should consider the delimitation conditions a) and b) delimit the conditions of analysis.

Our attempt to establish the unit of analysis, and thus the case, is related to how we formulated the initial study questions, namely: We wanted to identify the Needs, desires and demand for automated systems on the market, to study how we might profit from the interest-raising opportunity: Marketing of automated systems by designing an entrepreneurship in Automated Trading.

I.3.1 The primary analysis unit is: The marketing of automated systems

I.3.2 The Contextual analysis unit (existence of the case) is: Needs, desires and demand for automated systems on the market

I.3.3 The Embedded Analysis Unit is: Designing Business Entrepreneurship in the Marketing of Automated Systems

I.3.4 Linking data to hypotheses

It anticipates the data analysis stage, but the research design should help in building solid data bases for this study of investigation. The linking of data to hypotheses can be achieved in several ways, but none has become precisely defined. For this reason, we have opted for an approach to case studies that appears promising, i.e. pattern matching model. This analysis technique, applied in case studies, involves the use of a pattern matching logic, which compares an established pattern with empirical bases with an anticipated pattern. The pattern established (predicted) by us on empirical bases: Needs, desires and demand for automated systems on the market, might lead to the achievement of this opportunity: Marketing of automated systems by designing a form of entrepreneurship in the marketing of automated systems. The results will contribute to strengthening the internal validity of the study. In our case, the patterns are related to the dependent and the independent variables defined above, namely the predicted pattern with respect to the independent variable is defined before the data is collected. The information obtained in this case can be related to the theoretically determined hypothesis.

I.3.5 Criteria for data interpretation

The alternatives depend on our understanding of the circumstances in which the new findings of the study/ the opportunity (i.e. Marketing of automated systems by designing an entrepreneurship in Automated Systems Marketing) can be useful: Needs, desires and demand for automated systems on the market. We would like to point out here that people very often believe that the study serves only to itself, "not satisfying any practical need."

However, this pattern matching technique is valid also when it comes to an explanatory study, as the patterns can be related to either dependent variables, in our case: (needs), Needs, desires and demand for automated systems on the market, or to independent variables, in our case (opportunity): Marketing of automated systems by designing an entrepreneurship in Automated Systems Sale. This technique is also relevant if the study is descriptive, as long as the pattern is anticipated(predicted) with respect to certain variables and is defined before the data collection stage; in our case, the defined opportunity (Marketing of Automatic Systems by Designing an Entrepreneurship in Automated Systems Trading) is established before the data collection stage.

As the last component of the study design, the research anticipates the data analysis stage. The data obtained through the chosen strategies and techniques is a constant challenge for us, since we attempt to produce a quality analysis, which requires that our attention is directed to all the evidence. We have attempted to present the evidence objectively and show an appropriate interest in exploring alternative interpretations. We have used the combined criteria for interpreting findings, generally applying logical models, since "The logical model deliberately stipulates a complex chain of events over time. These are included in repeated cause-effect-cause-effect patterns. " That is, the dependent variable from an initial stage (needs): Needs, desires, demand for automated systems on the market "becomes an independent variable during a subsequent stage (opportunity):" The Marketing of Automated Systems by Designing an Entrepreneurship in Automated Systems Trading". The use of the logical model implies the matching of empirically observed events (needs): Needs, desires, demand for automated systems on the market with theoretically predicted events (opportunity): Automated Systems Marketing by Designing an Entrepreneurship in Automated Systems Trading.

I.4 Preliminary Theories

We first theoretically analyze the primary unit of analysis that includes: Marketing automated systems. According to its definition, marketing refers to the action of trading and its outcome, in practice, the sale of goods (which become commercial) and the outcome of this process. In the case of the sale of automated systems, the automated systems become an object of commerce put into circulation, in our case through an entrepreneurial activity that refers to the action of marketing automated systems as part of an integrated process of analyzing the demands: the needs, desires and demand for of automated systems on the market (customers: natural and legal persons), the acquisition of customer orders, the purchase of automatic systems from suppliers (manufacturers, intermediaries, importers) as goods in the commercial form of automated systems, the transformation of these goods into commodities by selling them to the customers who have placed the order, collecting the value of the automated system merchandise, evaluating the results of the trading action (profit). This is essentially the marketing of automatic systems. The concept of the market is represented by all customers who have the same needs or desires for automated systems and who are willing and able to engage in an exchange relationship to meet that need. In fact, the market is the last link of the chain that forms the concept of trading automated systems. Here, the concept of*product* is assigned to any automated system (devices, in-plant equipment, components, etc.) and to related services that aim to meet a need or desire (need). In this equation, the concept of selling is seen as one of the means whereby the entrepreneur approaches the market and the process of marketing, which offers the solution for entrepreneurs to achieve their own goals of determining the needs and desires of consumers interested automated systems and ensuring the expected satisfaction in a more effective way than competition has done already.

The concept of selling is delimited by the concept of marketing: "sales focus on the seller's (the entrepreneur's) needs, while marketing focuses on the buyer's needs. The sale deals with the entrepreneurs' needs to turn their product (the automated system) into money, while marketing insists on the idea of meeting the buyer's needs with the help of the automated system product and the entire chain of associated activities.

The following conceptualization (theorization), which unfolds around the Contextual Analyzing Unit (the existence of the case, needs), is: Needs, desires, demand for automated systems on the market. The philosophy of marketing is based on the needs and wishes of people; they need food, water, air, clothing and shelter to survive, but also have the desire to have access to everything that is modern and automatic, to travel by car, train, airplane, etc., with well-defined preferences for certain brands, versions of products or services. The needs of modern, nowadayspeople are unimaginable. A human need is a state when a person becomes aware of the lack of some elementary satisfaction: the need for food, clothing, shelter, safety, etc.

Desire is the aspiration towards certain things that might meet such needs. An example might be an individual who needs automated systems, in a complex combination, for heating a house. Despite the fact that needs are not very numerous, individuals have many desires.

Demand refers to an individual's desire for a particular product (Automatic Systems), doubled by affordability and the decision to buy that specific good. Desire turns into demand when it is supported by purchasing power.

We are going to theorize the Embedded Analysis Unit, which includes *Designing Business Entrepreneurship in Selling Automated Systems.*

Concepts and theory on Business Entrepreneurship Design, in this case, are fully coherent with the conceptualization and theorization included in the: "GUIDELINES FOR THE SIMULATION OF ENTREPRENEURSHIP IN THE Laboratory for Entrepreneurial Education and Training (LEFA) ". The answer we intend to give as regards thedefinition of entrepreneurship will refer strictly to entrepreneurship in business, because this is the topic we have chosen. We will not define social, political, research, entrepreneurship or inter-entrepreneurship, since they are beyond the area of interest in this approach.

The objective reality, like any other economic or social concept, shows that there is no single, unanimously accepted definition for entrepreneurship and for entrepreneurs, as persons involved in the entrepreneurial activity.

The entrepreneur has to demonstrate as much adaptability as possible and use intuition in order to anticipate as accurately as possible the changes that may occur in the future, using the most reliable information available, which in fact defines entrepreneurial arbitration. The entrepreneur must have a personal system of finding information faster than the market and his/her competitors.

An essential quality of an entrepreneur is the right attitude. From day-to-day activities we can see that people with an attentive attitude, even with nerve, are able to obtain more, compared to shy individuals, who never ask for their rights.

Entrepreneurs are generally regarded as persons who develop their own business project, based on an idea and assuming the risks that the project pre-supposes, but ultimately benefiting from the results of the business, if it turns out to bea successful one.

In fact, there are several areas where people, based on an idea (or a set of ideas), can develop valuable projects, even if they are not related to the business activity (projects may be related to social, political, research interests, etc.). Thus, there are other types of entrepreneurs as well, namely social entrepreneurs, policy-makers, research entrepreneurs etc.

Sometimes people have an exaggerated approach when they talk about their business ideas: "I have an excellent business idea," or "I have three or four extraordinary business ideas," or "I have dozens of business ideas, all valuable." But few entrepreneurial ideas are actually materialized in real business projects. It must be understood why people have such an approach when they talk about business ideas and why they become paranoid when they have to talk honestly about their ideas, behaving as if someone would intend to steal and use their ideas (and thus they prefer to keep their ideas for themselves).

Gathering Proofs (Data)

In our approach, we have collected the evidence from the following sources: questionnaires, direct observation, participatory observation, in line with the different methodological procedures for each situation in particular. In the data collection effort, we have complied with the principles of priority: "a) multiple sources of evidence (two or more sources converging towards the same findings, b) a database (including all the evidence gathered, not the final report and c) a logical succession of proofs (explicit links between the data collected, the questions asked and the conclusions reached). These principles have been respected throughout the investigation of the case, in order to increase the quality of the investigation. All sources have been regarded as helpful, and therefore we examined numerous articles, research methodology books, which included some of the texts of importance for our case study.

Interviews and questionnaires have been one of the most important sources of information for us.

II.1 Gathering data on the marketing of automated systems

The first step we took was that of examining market demand for automated systems.

The results obtained by vertically summing up the assessments helped us identify the strengths and weaknesses of Automated Systems Marketing. The analysis centered on automated systems does not imply that these systems must correct all their weaknesses, neither that they should make a title of glory, based on their strengths. The real problem is that of finding out whetherentrepreneurs need to limit themselves to those opportunities for whose capitalization they have the necessary forces, or whether they should rather focus on better opportunities, for whose exploitation they will have to develop new strengths.

	Appreciation					Importance		
	Major force	Minor force	Neutral	Minor weaknesses	Major weaknesses	Great	Average	Little
Commercial capacity								
1. The reputation of the firm								
2. The market share								
3. The quality of products								
4. The quality of services								
5. The efficiency of the price policy								
6. The efficiency of distribution								
7. The efficiency of advertising								
8. The efficiency of the marketing force								
9. The efficiency of innovation								
10. Covering demand at the geographic level								
Financial capacity								
11. Capital/capital availability								
12. Cash flow								
13. Financial stability								
Marketing capacity								
14. Means								
15. Economies of scale								
16. Capacity								
17. Qualified sales force								
18. Ability to sell according to the chart								
19. Commercial skills								
Organization capacity								
20. Visionary leadership								
21. Involved employees								
22. Orientation capacity								
23. Flexible/dynamic organization								

Entrepreneurs should rather be able to rely on a powerful marketing information system. They and their employees need to understand consumers up very well, to the smallest detail.

The need for marketing information is more acute than ever as a result of market trends.

II.2 Gatheringproofs (data) as regards needs, desires, demand for automated systems

In order to obtain evidence (data) about needs, desires, and demand for automated systems, we have used the questionnaire technique, as shown below:

A. ÎNTREBĂRI ÎNCHISE		
Denumire	Descriere	Exemplu
Dihotonice	O întrebare cu două răspunsuri.	Când v-aţi hotărât să cumpărați Sistemul automat, aţi telefonat la un antreprenoriat de comercializare a Sistemelor automate? Da ☐ Nu ☐
Alegere multiplă	O întrebare cu trei sau mai multe răspunsuri.	Cine vă însoţeşte în această achiziţie? Nimeni ☐, Soţia/soţul ☐, Toată familia ☐, Numai copii ☐, Parteneri de afaceri ☐, Prieteni, rude ☐, Grup turistic ☐, Alţii ☐
Scara lui Likert	Un răspuns prin care cel chestionat îşi arată acordul sau dezacordul.	În general, antreprenoriatele mici oferă servicii mai bune decât cele mari? Dezacord total ☐ Dezacord ☐ Indiferenţă ☐ Acord ☐ Acord total ☐
Diferenţiala semantică	O scală cuprinsă între doi termeni bipolari şi pe care subiectul alege punctul reprezentând aprecierea sa.	Ce fel de antreprenoriat este aceasta de la care doriți să achiziționți Sistemul automat? Mare……..Mică Cu experienţă……..Fără experienţă
Scala importanţei	O scală pe care se apreciază importanţa unei caracteristici.	Consider autoinstruirea privind sistemele automate la ca fiind: Extrem de importantă ☐ Foarte importantă ☐ Destul de importantă ☐ Nu foarte importantă ☐ Deloc importantă ☐
Scala de apreciere	O scală pe care o caracteristică este apreciată cu calificativ de la „slab" la „excelent".	Serviciile antreprenorului sunt: Excelente☐, Foarte bune☐, Bune☐, Medii☐, Slabe☐
Scala intenţiei de cumpărare	O scară care descrie intenţie de cumpărare a subiecţilor.	Dacă antreprenoriatul ar dispune de un serviciu de mentenanţă a sistemelor automate, aţi apela la el? Da, cu siguranţă ☐, Probabil că da ☐, Nu ştiu ☐, Probabil că nu ☐, Sigur nu ☐
B. ÎNTREBĂRI DESCHISE		
Complet nestructurale	O întrebare la care subiecţii pot răspunde cum doresc.	Ce părere aveţi despre antreprenoriatul pentru comercializarea sistemelor automate?
Asocieri de cuvinte	Se dau pe rând diferite cuvinte, iar subiecţilor li se cere să noteze primul cuvânt care le vine în gând.	Care este primul cuvânt la care vă gândiţi când auziţi pronunţându-se - antreprenoriat? …… - sisteme automate? ……

		- servicii ale sistemelor automate? ……
Completarea frazei	Subiecţilor li se prezintă o frază incompletă pe care trebuie să o continue.	Când aleg un anumit antreprenor, cel mai important lucru după care mă ghidez este ……
Completarea unei povestiri	Subiecţilor li se prezintă o povestire incompletă pe care trebuie să o continue.	Am ales un antreprenor şi am observat că sistemele automate comercializate de el au funcționat perfect. Aceasta m-a făcut să mă gândesc la ……
Completarea unei imagini	Subiecţii primesc un desen înfăţişând două persoane dintre care una face o afirmaţie. Subiecţilor li se cere să completeze replica celuilalt personaj.	
Testul de apreciere tematică	Subiecţilor li se prezintă o imagine şi li se cere să prezinte ceea ce cred ei că se întâmplă în aceasta.	

II.3 Gathering proofs on the Design of Entrepreneurship in Automatic Systems Marketing

Gathering Data on Designing Entrepreneurship in Automated Systems Marketing refers basically to describing the structure of the project before the Evidence Analysis stage, which will actually be the business plan of the entrepreneur (it is written after drawing up the plan and inserted at the beginning of the plan); Market and industry analysis; Business description; Production and / or operations plan; Marketing plan; Organizational plan; Risk evaluation; Financial plan; Attachments, additional materials.

Data analysis

The last chapter of the entrepreneurial project is actually the completion of the business plan, based on the business idea: The Marketing of Automated Systems, following the stage of data gathering about the three analysis units and the analysis of information gathered. These stages are followed by the drawing of the business plan. The entrepreneur, alone or together with his/her consultants elaborates the Business plan.

Introductory page:

Automated Systems Marketing
Oradea, str. Universitatii, nr.1
Site: www.comercializaresistemeautomate.ro,
Bank Account:
Business documents:

The executive summary is a summary of the business plan (it is written after the plan is drawn up and is introduced at the beginning of the plan). It is vital because many persons who might read the plan (partners, investors, etc.) actually read only this summary, so it is important to include here the most relevant data to convince readers about the value of the business. It is basically a synopsis.

Market and industry analysis.

The entrepreneur calls for a so-called rate of appreciation of the level of competition in order to improve its competitive position.

The entrepreneur looks for the most important factors of the success of some companies competing with the entrepreneur intending to trade Automated Systems, in the vision of their customers.

The next step is to search for and find financial, material and management resources (location, manufacturers of different automated systems to purchase and resell to our customers).

Production plan and / or the operations plan: Depending on the type of activity, a detailed production plan is not necessary unless the business to which the plan relates is one with specific production activities and a business in the field of commerce, services or from other fields of activity; at this stage one might present the details of the operations, even if many of the services or products

sold also go through a minimal production process (packing, assembly, packaging and delivery, or other processes similar to that of production). Processes, suppliers and relationships with them, raw materials or goods used, operations in all production or sales areas, workflows, used technologies, etc. will be described.

The marketing plan. The four factors: Product, Price, Market, Promotion, analyzed in relation to the business, will lead to the development of a relevant marketing plan in the context of a general business plan.

SECTION	OBJECTIVES
	A study will be made on potential customers for the sale of about 50 Automated Systems at an estimated price of 2000-euro/ piece with assembly. This auction is followed by the purchase of 50 self-owned systems with implicit or explicit customer specifications that will be purchased directly from the manufacturer at an estimated price of between 1500-1700 euro with a gap of at least 3%. Ensuring courier transport of Automated Systems at the address indicated by the customer. Mounting, at the customer's request, of the Automatic System, calculating the work according to the employee's qualification, the required workload. Commissioning. Receiving the Counter-Value of the Automatic System and Workmanship. All this is done on the basis of a contract between an entrepreneur and the client, and for purchases between the contractor and the manufacturer.
II. The current market context	Relevant data concerning the situation of the current market, of the Automated systems and the macro environment are those presented in Chapter II, for the start-up situation of entrepreneurship.
III. Analysis on the occasions and the problems the entrepreneur faces	The tests completed based on questionnaires and interviews conducted on a sample of 100 potential clients have shown that: 70 respondents answered to this test either positively or negatively, with 50% having given an affirmative answer. Thus it appears that both opportunities and threats from the competition already on the market are perceived in this start-up situation. The strong points of entrepreneurship consist in the fact that it has proposed a form of financing based on savings and the attempt to use national financing sources to fund start-ups, but also in the fact that it addresses a specific market segment. The weaknesses are those characteristic of the beginning of a business: hesitations, lack of experience, lack of courage, etc..
IV. Objectives	The main objective is the selling of 50 Automated Systems. To obtain, during the first cycle of the start-up, of %0 orders for Automated Systems, either with or without assembly. Order at the manufacturer of 50 Automated Systems and ensuring delivery by courier at the address indicated by the customer. Installing at least 80% of the systems at the customer's address. Making functional all the Systems installed. Getting the counter value of the transactions. Paying the debts owed to suppliers and employees. Making payments to the state..
V. The marketing strategy	In order to achieve the specific goals of entrepreneurship, the entrepreneur will resort to adequate promotional marketing, such as the setting of a web page, the use of those forms of advertising and promotional items that are cheaper. Entrepreneurship will be promoted using the strategy of promoting the business"from mouth to mouth". The databases that can be purchased will also be used so as the entrepreneur will be able to use email addresses, web pages and phone numbers, etc. in order to submit offers and information about entrepreneurship. Other marketing strategies..
VI. Action programs	A study will be conducted on the needs, desires for automated systems by the contractor or a consultant starting with the first day when the decision to begin the entrepreneurship is taken. This strategy will use 10% of the management expenses. Offers will be launched to prospective customers. The entrepreneur and the employees will launch orders to the manufacturers, immediately after receiving the order from the customer. Such actions are part of the obligations of both the entrepreneur and the employee responsible for marketing, and the expenses for these activities are included into wage costs. The Sales Officer will ensure the transport of the Automated Systems at the address indicated by the Customer, as part of his/her professional duties, the expenses for this action being included in the salary costs. The Sales Officer will also ensure the assembling and commissioning of the Automated Systems at the customer's address, as part of his/her professional duties, the expenses for this action being included in the salary costs.
VII. Profits and expenditures	Profits and expenditures The estimated capital required in the start-up phase is € 70,000 from sources such as the entrepreneur's own savings and by attracting start-up finance. Salary costs: 600 euro / month / employee. Selling 50 Automated Systems / year at a price of 2000 euro. Purchase of 50 Automated Systems / year for a maximum of 1800 euros. Estimating a 10% profit resulting from subtracting expenses from revenue.
VIII. Means of control	The entrepreneur will supervise the implementation of the plan, based on the daily completion and analysis of the managerial instrument called the board book.

The organizational plan.

Entrepreneurship is the property of the entrepreneur, who is responsible in all respects for the commercial act performed, for ensuring the financial and human resources necessary for the activity of the business. He/she is responsible in relations with third parties for all problems of entrepreneurship. However, he/she is also the beneficiary of the profit and of all the advantages offered by entrepreneurship.

The entrepreneur is at the highest level of authority, he/she sets the rules for holding the company as well as all its levers and mechanisms. He/she establishes the management team, which is made up of the entrepreneur himself/herself, the financial officer and the marketing officer. The entrepreneur is the one who hires the other members of the managerial team and the other employees, at the same time establishing their positions in the Organigram and the authorities and responsibilities within the entrepreneurship. It establishes the monitoring and control mechanisms through the Board Book.

Risk evaluation. Once the management team has been set up, the entrepreneur and the team will urgently undertake the action of assessing the risks of entrepreneurship: financial risks, market risks, human resources risks that have to be a separate and well documented chapter in the business plan. In order to be faced, the risks must be set as clearly as possible in the business plan and, at the same time, counteraction solutions (Plan B) must be proposed for each of these risks identified (or a combination thereof). This is, in fact, the moment when the viability of a business is determined, especially if there is a set of risks outside the control of the entrepreneur. Due to the presence of risks, contingent solutions cannot be established (the combat), thus the entrepreneur has to assume all the identified risks, with all their implications.

The financial plan. Its elaboration is based on the most realistic proposals coming from either entrepreneurs and key employees, namely:

The estimated capital required in the start-up phase is € 70,000 from sources such as the contractor's savings and the attraction of start-up founding.

Salary costs: 600 euro / month / employee.
Selling 50 Automated Systems / year at a price of 2000 euro.
Purchase of 50 Automated Systems / year for a maximum of 1800 Euros.
Estimated 10% profit, resulting from subtracting expenses from revenue.

Without these initial proposals, no financial planning can be made; therefore, the action must start with a serious budget exercise, possibly resumed several times, in order to reach cost structures and incomes that are as close to reality as possible. In the financial plan, the most important part is probably the cash-flow planning. At an initial stage, the Financial Manager achieves the financial planning of entrepreneurship on cash-flows, since it is essential for employers to be able to pay bills, wages for employees, etc. from the very beginning; such aspects are highlighted at the end of the day by the "red entry" control figure. There is no need to make a profit-making plan at the initial stages. Once the break-even level is reached (the point where the business does not lose money as a business, either on current costs or on total costs), the entire investment and financing plan of the company will be organized.

Appendices, additional materials: In any business plan, sets of information are used, which are more extensive than the actual plan. This information of interest to those studying the Business Plan can be finally included as appendices (structured, numbered, and easy to find). In such a section one might also include: key people's resumes, references, market studies, copies after important contracts, price lists, and other documents.

The elaboration of this plan will be done only after completing the chapter dedicated to the "Evaluation of Industry and Competitiveness". The data included in the marketing plan should be clear, relevant, based on credible sources of information not only on internal data or entrepreneurial estimates. The marketing plan must contain: a clear strategy, with concrete objectives, with action plans, with associated budgets (to be correlated with the financial plan). In addition, marketing plan development should start with the analysis of the target market by identifying opportunities and threats on this market. Then, it is advisable to determine the strengths and weaknesses of the business by means of the SWOT Analysis = Strengths, Weaknesses, Opportunities and Threats. Strengths and opportunities should be regarded separately and not mistakenly taken for one another, which also holds true for the relationship between weaknesses and threats.

The organizational plan. It is a very important part of the business plan because the organizational plan includes rules regarding the company's ownership (shareholders, levers and mechanisms, the levels of authority, the management team, the employees and their positioning in the Organigram, but also the roles and re- sponsorships, monitoring and control mechanisms).

Risk evaluation. This part should represent a separate and well-documented chapter included in the business plan. In order to be confronted, the risks must be clearly stated in the business plans at the same time, for each risk in particular, or for combinations of risks, alternative solutions should be proposed (Plan B). This is, in fact, the moment when the viability of a business is determined, especially if there is a set of risks outside the control of the entrepreneur. Due to their existence, contingent solutions cannot be established, but the entrepreneur will still assume them with all their implications.

The financial plan. Its elaboration is based on some of the most realistic proposals from the entrepreneurs and key people. Without these initial proposals, no financial planning can be made; it should start with a serious budget exercise, possibly resumed several times, to get some cost and income structures that are as close as possible to reality. In the financial plan, maybe the most important part is the cash-flow planning. In the beginning, financial planning of entrepreneurship should be done on cash-flows, because it is not okay not to be able to pay the bills, the person, etc. from the very beginning. and this is highlighted at the end of the day with the "red entry" control. There is no need for financial profitability from the start. Once the break-even level is reached (the point where the business does not lose money as a business, either on current costs or on total costs), it will continue to organize the entire investment and financing plan of the company.

Appendices, additional materials: In any business plan, sets of information are used, much larger than the actual plan. This information of interest to those studying the Business Plan can be finally included as appendices (structured, numbered, and easy to find). In the appendices section one may also find: key people's resumes, references, market studies, children after important contracts, price lists, and more.

Discussion and conclusions

Proiectul antreprenorial reprezintă pentru imginerul economit, in faza de idée de afacere și proiectare, performanța sa profesională, iar in faza de implementare, performanța sa în afaceri sau antreprenorială.

References

Campbell, D.T.
1975
"Degrees of freedom and the case study", Comparative Political Studies, 8, 178-193.
Yin, R.K.
2005
Case Study Research.Design and Methods, Sage Publications, Thousand Oaks, London, New Delhi.
Măgdoiu, L.D., Rada, I.C.
2014
Managers and engineer economists between Social Economy Developinent and obtaining Profit, presented at Proceedings of the 4th Review of Management and Economic Engineering International Management Conference „The Management Between Profit and Social Responsibility" 18th – 20th of September 2014 Tehnical University of Cluj-Napoca, Romania, www.rmee.org
Rada, I.C., Măgdoiu, L.D., et. al.
2016
Managers and engineers economists between the sociology of elites and the social economy of vulnerable groups, presented at Proceedings of the 5th Review of Management and Economic Engineering International Management Conference „From Management of Crisis to Management in a

Time of Crisis" 22nd-24th of September 2016 Tehnical University of Cluj-Napoca, Romania, www.rmee.org .
Rada, I.C. and Rada, I.C.
2018
Using banking information security management to ensure system stability and investors' well being. International Journal of Advanced and Applied Sciences, 5(1): 49-60, http://www.science-gate.com/IJAAS/2018/V5I1/Rada.html.
Rada, I.C. and Rada, I.C.
2018
The engineering of the prudential supervision structure - essential factor of financial-banking stability in the European context of Romania. International Journal of Advanced and Applied Sciences, 5(4): 14-23, Permanent Link: http://www.science-gate.com/IJAAS/2018/V5I4/Rada.html.
Măgdoiu, L.D. and Rada, I.C.
2018
The necessity of developing the economic engineering specialization in the current context of Romania's economic structure. International Journal of Advanced and Applied Sciences, 5(5): 48-60 Permanent Link: http://www.science-gate.com/IJAAS/2018/V5I5/Doina.html

THE PERFORMANCE MANAGEMENT PROCESS – A NECESSITY IN THE SUCCESS OF A BUSINESS REDESIGN PROGRAM

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Abstract

Purpose *– The research aims to determine the categories of internal factors and their intensity. The analyzed internal factors were considered to have contributed in different ways to the successful implementation of programs for the redesign and remodeling of businesses in the Jiu Valley enterprises. The study is broader, but only a part of the research findings, those related to the internal factors of the organization involved in the changeover and redesign processes, are presented in this paper.*

Methodology/approach *- The research methodology is the questionnaire, which consists of 2 parts. Based on research conducted internationally by a number of authors such as: Mlay S. V., (2013); Guimaraes T. (1998); He X. J. (2005), and based on the studies conducted by the management consultancy company: Ensight Management Consulting Bucharest from Romania, I designed my own questionnaire. The first part of the questionnaire includes 9 questions in order to identify respondents' data; and the second part contains 24 questions. The survey was conducted in 2015 on 34 enterprises in the Jiu Valley, from a representative number of 74, and the response rate was about 64 percent of the total.*

Findings *– Managing processes, leadership and advanced strategic management have a great influence on the successful realization of any major redesign or change program. The success of a business redesign process is the result of a bunch of positive influence factors such as: a visionary management with clearly defined strategic objectives, efficient and effective allocation of resources; promoting management systems through which employees are trained and stimulated for what they need to do; practicing a management based on the principles of leadership, functioning of efficient management processes.*

Research limitations/implications *– The limitations of the research may be represented by the possibility that the respondents did not understand too well some concepts related to the processes of the redesigning of the business, or another aspect would be the subjectivity in the given answers.*

Practical implications *– The study results, assessments, and conclusions can be consulted by business managers who want to apply business redesign processes after the BPR model, continuous improvement processes, TQM, or other change management projects. Following the study, recommendations have been formulated for top managers in companies to help them concentrate and focus on success factors and act in a manner to minimize the failure to implement a possible redesign project.*

Originality/value *– I designed a questionnaire with several categories of questions, so that by analyzing the answers I was able determine the intensity and importance of distinct categories of internal and external factors to the organization that may be involved in the processes of redesigning the business.*

Key words: *performance management, redesign processes, strategic management.*

Introduction

The major changes in terms of business environment, clients, competition, including the unprecedented diversification of international economic affairs, lead to a new way of addressing business processes, business management, and identifying those strategies, methods and techniques that transform them into excellent businesses and bring added value to clients. One of the solutions would be to redesign the business management by changing how business processes are conducted

and organized based on the principles of reengineering (redesigning or rethinking an enterprise's processes). Another high-performance solution would be to continuously improve the existing business processes at the firm level, based on the Japanese management principles of Kaizen philosophy.

In view of these aspects, we considered it useful that, in order to revitalize the economic and social situation in the Jiu Valley, the companies and firms here may apply processes to redesign the business or they may opt for continuous improvement. The managers can apply redesign solutions provided they are familiar with these solutions, in order to be able to adopt the principles of successful implementation of such processes. In order to find out the chances of economic and social recovery in the Jiu Valley, I investigated the status and attitude of the managers in relation to those mentioned above. Thus, the situation I present in this material is part of a larger study that has as main purpose to determine whether: the managers of enterprises in the Jiu Valley know and apply processes of managerial redesign of the business. I started the research on the basis of the theoretical and empirical scientific abstracts belonging to: Hammer M. and J. Champy (1996); Drucker P. (1993); Peters T .J. and R. Waterman (2010), Al-Mashari M. (2001), Mlay S. V., (2013); Guimaraes T. (1998); He X. J. (2005).

One of the findings of the study is that a number of external and internal factors contribute to the successful realization of a business management reprocessing process. Within this paper I present the most relevant internal factors of influence in the process of change and managerial redesign of a business, with particular analysis of top management involvement and management processes.

1. Research Conditions

In this research, I have looked at several issues starting from:

- presenting the situation and state of the business environment in Jiu Valley in a regional and national context;
- probing the state of the business environment in the enterprises from the Jiu Valley;
- finding top management's opinions on management of change, redesigning and remodeling business processes;
- the level knowledge and implementation of some strategies for redesigning or continual improvement;
- if business redesign projects were applied, and where they were applied, if the following were analyzed: the degree of change; their goal measured by success, namely the achievement of the proposed objectives; which were the objectives of the implemented projects; internal and external factors of positive or negative influence; ways of measurement and the intensity of the influence of factors, as well as other analyze-derived aspects.

I conducted several steps and phases in conducting this research:

1. Drawing up and submitting the questionnaire - in these phase I designed the questionnaire and the number and structure of the questions were determined with the help of the Cronbach alfa-α internal consistency coefficient for establishing the methods and techniques in math statistics that are appropriate and necessary for the processing of responses.

   This phase also includes: formulating the questionnaire; identifying respondents; determination of the representative sample; sizing the sample; submitting the questionnaire.

2. Collecting answered questionnaires, analyzing and processing the responses
3. Interpretation of results. In calculating indicators of the degree of influence of internal and external factors, I used the 5-step Likert Scale, which has four variants of appreciation, depending on the composition of the items, the weighted average coefficient, the average coefficients, the grades and scores give in the 5 steps.

2. Research Hypotheses

The hypotheses of the research that I present in the paper are as follows:

Hypothesis 1. Businesses in the Jiu Valley know and apply projects for managerial redesign of the business.

Hypothesis 2. The successful implementation and completion of a business redesign program within an enterprise is determined by the influence of internal factors: human resource, operational and technical factors, communication, management methods and techniques.

Hypothesis 3. Success in achieving the goals of a business redesign program is closely related to its top management support.

3. Research Results

3.1. Status of business redesign programs – 1st Hypothesis

After processing of the answers, I came to the conclusion that the enterprises of the Jiu Valley do not know and do not apply business managerial redesign processes, and the activities are not conceived in the terms and conditions of managerial redesign processes known in practice and in specialty literature. Thus, in Figure 1, I highlighted the fact that 15 percent of the analyzed enterprises said they were applying redesign processes; 11 percent of businesses are undergoing improvement and moderate change processes; and the remaining 74 percent do not know or do not apply such processes. At the same time, most of the companies that have applied or that are still applying a redesign program said they are in a process of change, the companies being especially in the field of financial and banking services and insurance.

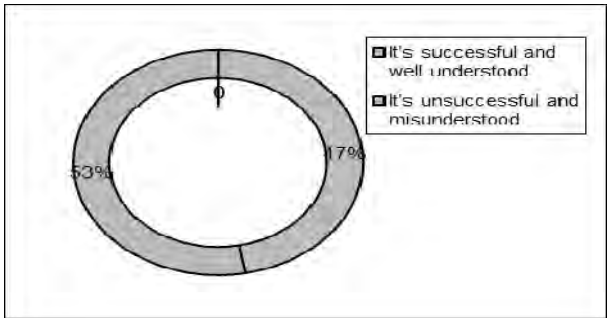

Figure 1. The situation regarding the managerial redesign of the business

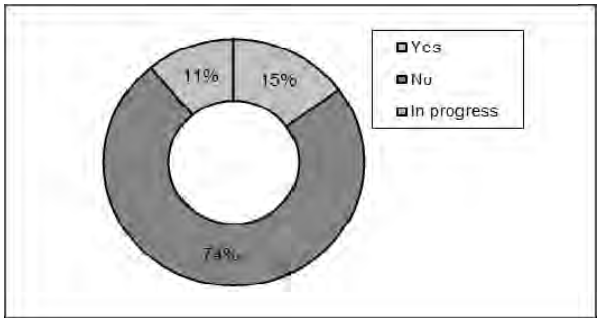

Figure 2. The grade of understanding and knowledge of redesigning

Figure 2 shows the companies that have applied or implemented business managerial redesign projects, 53 percent of them claiming that this process is well understood and successfully adopted where it was intended to be implemented, and the rest of enterprises, with 47 percent, asserts that this process is not well understood and the planned success has not been recorded. In Figure 3, I presented the most relevant recorded benefits and performance in businesses where redesign programs have been successfully deployed. The benefits are in particular: increasing product quality, reducing costs, increasing the degree of clients satisfaction and trust.

Figure 3. Objectives achieved in the successful redesign of the business in enterprises

3.2. Factors Influencing the Success of Business Redesign – 2nd Hypothesis

Research results confirm that the respondents agree to the fact that success in finalizing a business redesign program is determined by external factors and, above all, by the influence of internal factors. The perception of the intensity of these internal and external forces is presented below:

- internal factors * have a higher intensity - H, than external factors with medium intensity – M; this influence is shown in Figure 4 below.

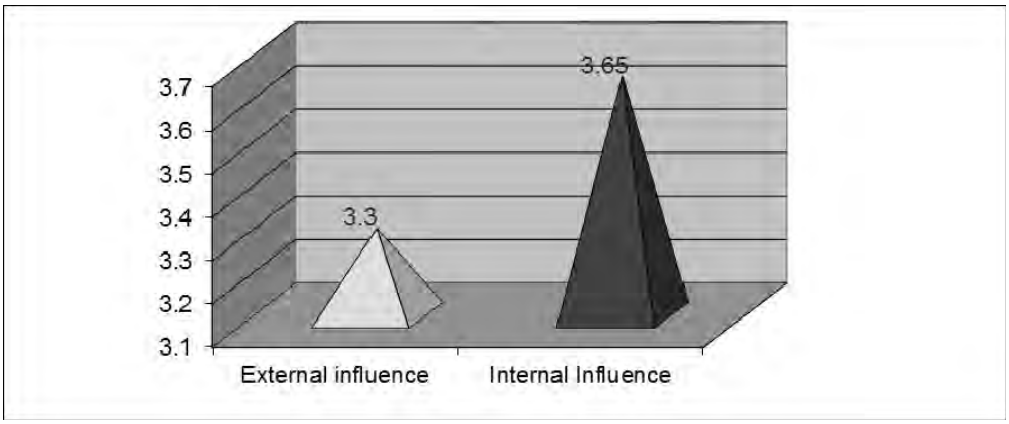

Figure 4. Influence of internal and external factors in the success of redesign

Figure 5 shows the internal factors that contribute to the success of a redesign process; they are mainly in the order of influence: those related to communication and organizational culture; management and leadership; operational and technical factors; employee and managers level of involvement, all of these factors have high intensity H; methods and techniques of working have intensity M.

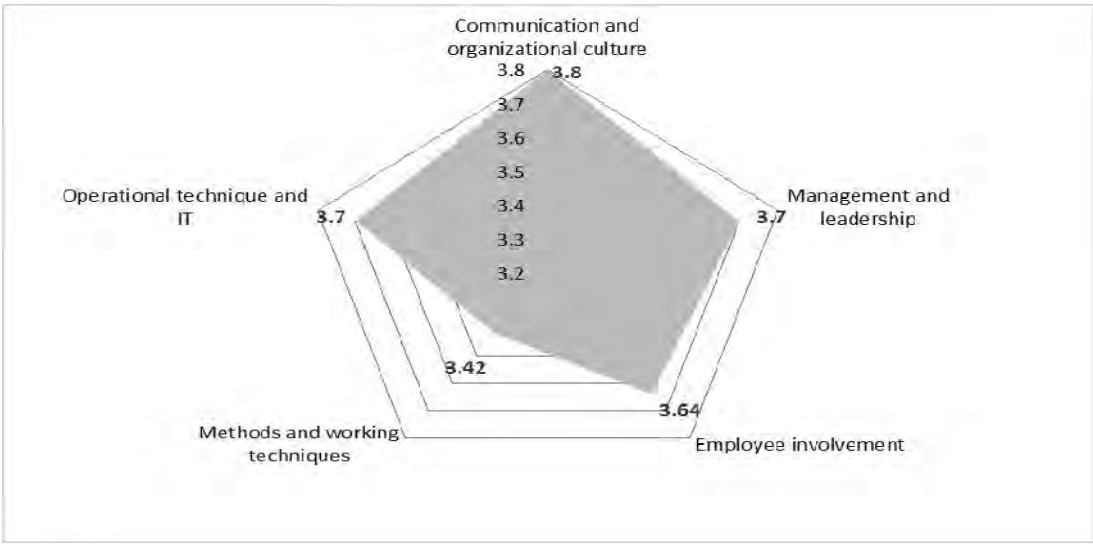

Figure 5. Influence of internal factors on the success of business redesign

The analysis of the results shows the factors that contribute most to the successful completion and to the achievement of the objectives of a business redesign program are those related in particular to communication and organizational culture, to management processes, planning and vision and to leadership advancement.

3 3. Quantification of emotional factor and of the management and technology – 3rd Hypothesis

Success in completing a business redesign program is mainly driven by factors such as: the contribution of technology, industrial and IT technology, by the emotional factor in the first place, and by the support given by the strategic management - Figure 6.

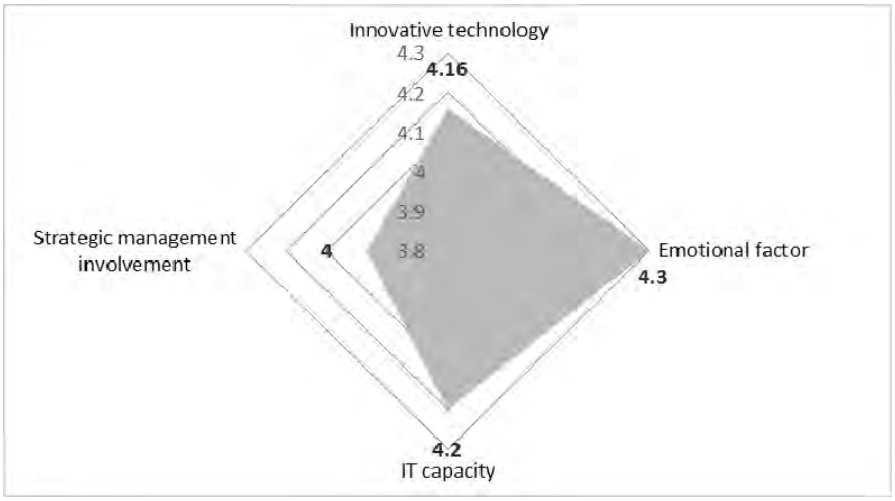

Figure 6. Degree of influence factors: emotional, management, IT and automation

3.4. Viewpoints on the benefits and performances that have to be brought to a redesign process

From the processing of results it was found that managers are not very convinced that a redesign process would achieve spectacular and excellent results on cost, quality, service and flexibility. However, they have made a profit hierarchy. Respondents are of the opinion that the greatest influence should be achieved by increasing quality, reducing costs, in flexibility, and then during the service related to the core business process.

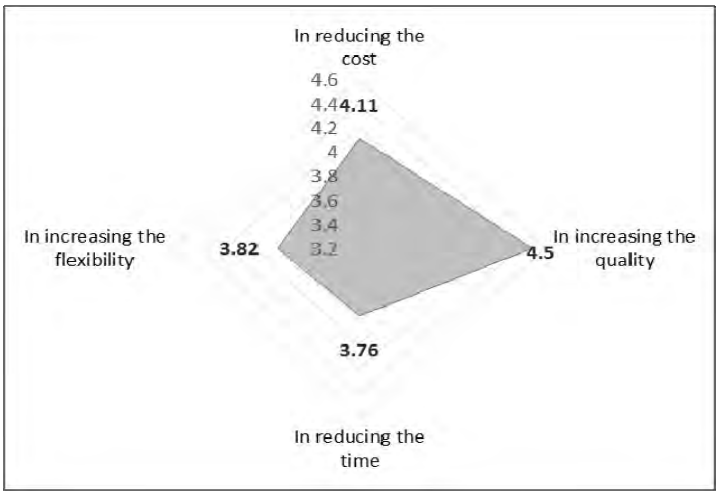

Figure 7. Grade of importance given to basic benefits

The degrees of importance granted to operational benefits and the performances of the company that can be obtained through redesign are presented more in detail in Figure 8.

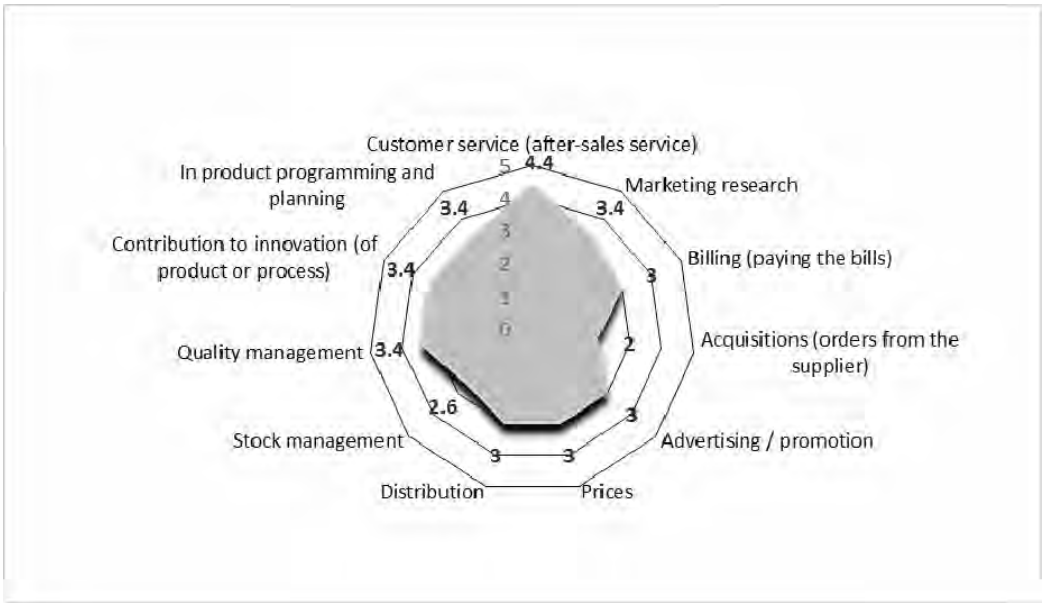

Figure 8. Points of interest for operational benefits

The greatest importance in terms of operational objectives is given to the benefits that could be gained in favor to client relationships, the benefits of product and process innovation, new product development, planning, inventory management and the relationship with the suppliers.

In assessing the performance that can be achieved through redesign processes, the greatest importance seen by respondents is given to indicators that measure: sales growth, return on investment, sales profits, market share, operating profits.

Figure 9. Importance levels of performances

Discussion and conclusions

Discussion. Some of the results obtained after analyzing the situation of the enterprises in the Jiu Valley can be divided on the one hand as positive aspects and on the other hand as negative aspects.

Table 1

Positive Aspects	Negative Aspects
- The managers have higher education, most of them have training in the field they manage; - there is an openness to change, although most opt for continuous improvement, a significant share of about 25% would opt just for moderate change; - female managers are more receptive and open towards radical change; - Targets are focused towards clients, cost and quality; - More and more managers perceive the fact that they need to take account of customer requirements and exigencies; - More and more managers are aware of the importance of innovations, business development and research, modern technology and IT in line with the organization's goals - a favorable aspect would be that they opt for permanent business improvement projects.	- In most Jiu Valley businesses, management does not develop clear business plans for the long run, they do not have a clear vision of their business; - they do not engage in long-term, uncertain and high-risk projects; - they don't have an entrepreneurial mindset; - there is still often an excessive centralization of power and no delegation of authority; in many cases the person responsible for a particular work process is not clearly identified; - Most managers are focused on the inside of the enterprise and less towards the outside, the market; - In most cases, more emphasis is placed on reducing costs and on internal control, rather than on flexibility, and on customer and market requirements; - they have not clearly identified the activities that add value to the organization and to the customer alike; - the needs of the clients are still superficially treated, the same thing also happens to the employees; - a leadership based on monitoring, measuring and rewarding performance is not clearly promoted yet.

Recommendations for the Top Management
- Managers should be more open to new things and more careful to the changes in their business environment, in order for their business to have the needed flexibility to stay on the market and to maintain its performance levels. - they should have the desire to learn and to apply new business strategies that are market-oriented and customer-oriented; - to have dedication, passion, perseverance and patience in everything they do; - to clearly formulate the vision of their business and to formulate targets in terms of management through objectives and SMART objectives; - To create clear competitive advantages, in time, through the applied business strategies compared to their main rivals, so that customers can easily identify and choose their products or services

Conclusions**.** Innovative technology, automation and IT capabilities are factors that are crucial in making changes that involve introducing new processes of manufacturing goods and services, increasing the quality, obtaining reductions in manufacturing costs, increasing the time of product and service execution, including timely delivery to the customer, flexibility and adaptability to market requirements.

Management processes, leadership and strategic management all have a great influence on the successful redesign of a business. Practicing a visionary management with clearly defined strategic objectives, allocating resources in an efficient and effective manner, promoting management systems through which employees are trained and motivated in what they do, with leadership-based management principles is the key to successfully achieve the performance of a managerial redesign process.

References

Al-Mashari, M., Z. Irani, and M. Zairi
2001
"Business process reengineering: a survey of international experience." Business Process Management Journal, 7: 437-455. MC B University Press.
Druker P.
1993
”Inovaţia şi sistemul antreprenorial.” Editura Enciclopedică, Bucureşti.
Ensight Management Consulting
2010
"Studiul Naţional de Business Process Redesign." Ensight Management Consulting**,** București.
Ghicajanu, M.
2015
"Managerial Redesign in Business with study on companies in the Jiu Valley." PhD Thesis, University Valahia of Targoviste.
Guimaraes, T., and J. E. Owen Chair
1998
"Important Factors For BPR, Success In Manufacturing Firms." 5: 1-17. Gestão & Produção.
Hammer, M., and J. Champy
1996
”Reengineering-ul (reproiectarea) întreprinderii: un manifest pentru o revoluţie în managementul afacerilor.” Editura Tehnică, Bucureşti.
He, X. J.
2005
”A comparative study of Business Process Reengineering in China.” 5: 25-30. Communications of the IIMA.
Limam Mansar, S., and H.A. Reijers

2007
"Best practices in business process redesign: use and impact." Business Process Management Journal, 13: 193-213. Emerald Group Publishing Limited.
Mlay, S. V., I. Zlotnikova, and S. Watundu
2013
"A Quantitative Analysis of Business Process Reengineering and Impacting Factors: The Case of Uganda." 5: 1-26, The African Journal of Information Systems.
Peters, T. J., and R. Waterman
2001
"În căutarea excelenţei. Lecţii de la companiile cel mai bine administrate din America." Editura Meteor Press, Bucureşti, traducere Eugen Damian.

THE MEDIATING ROLE OF THE POLICY OF REWARDING CREATIVE EMPLOYEES ON THE RELATIONSHIP BETWEEN THE PERSONAL INNOVATION POTENTIAL AND ORGANIZATIONAL INNOVATION. EVIDENCE FROM ROMANIA

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Abstract

Purpose *– The aim of this paper is to analyse the relationships between the personal innovation potential, the organizational innovation, and the policy of rewarding creative employees.*

Methodology/approach *– The study develops hypothesis and test them using survey data. This quantitative approach uses the perception of respondents.*

Findings *– This paper provides empirical evidence that the policy of rewarding creative employees has a mediating role on the relationship between personal innovation potential and organizational innovation.*

Research limitations/implications *– This is an exploratory study, based on 56 employees' perceptions, the majority of the respondents being represented by women.*

Practical implications – *If an improved business performance is desired, the management department of a company can analyse performance at individual, organizational or macroeconomic level. Improving business performance can also be done by developing the company innovation potential, whether we are referring to product, process, organizational or marketing innovation. Using a policy of rewarding creative employees conducts to a high level of organizational innovation that leads to an improved level of business performance.*

Originality/value *– Our findings indicate that reward methods vary depending on the gender of the employees, financial rewards being important for both males and females workers.*

Key words: *Personal innovation potential, organizational innovation, rewarding policy*

Introduction

Lately, people are talking more and more about the innovation process, whether it is about process, product, marketing or organizational innovation. The processes of innovation include a series of activities that try to turn one or more ideas into competitive advantages, which happens when companies develop and harness creative employees' initiatives.

However, not every time employees are encouraged, motivated or rewarded for expressing their ideas, even if this would help to develop the company. Thus, the purpose of this paper is to study the mediating role of the policy of rewarding creative employees on the relationship between the personal innovation capacity and organizational innovation. For each analysed construct, several measurement indicators were proposed to determine the dependencies between the identified variables.

Theoretical background

Talking about the business field, it can be said that in order to survive or to succeed, the companies must be innovative (Cummings and Oldham, 1997). Considering that global competition had been intensified, firms must introduce or develop new products or services, being innovative inside their own boundaries, and depending on their employees (Tajeddini and Trueman, 2008).

In the management literature, we discovered creativity as the most distinctive personal characteristic, often associated with innovation (Miron**,** Erez, and Naveh, 2004), employee creativity being considered one of the main requirements of an organizational innovation (Hon, 2012; Scott and Bruce, 1994).

Cummings and Oldham (1997) presented that there are some differences between “innovation” and “employee creativity”. They highlighted that employee creativity is the “the raw material for innovation”, while innovation refers to “successful implementation of new outcomes by a firm”. They also demonstrated through their paper that employees which had a creative personality did not necessarily produce more creative works than other employees if they do not have an environment that can bring out their creative potential.

Miron et al. (2004) described that the innovation potential depends on the personal characteristics of an employee, who should not only be creative, but also be careful about details and adhere to certain rules to ensure the quality of products or services. They demonstrated in their work that employees have the ability to be creative, to pay attention to detail, and to achieve innovative performance.

There are a limited number of studies that analysed the positive effects of innovation and creativity on business profit and competitive advantages (Janssen, Van de Vliert, and West, 2004; Anderson, Potocnik, and Zhou, 2014). The results of a study by Shanker, Bhanugopan, and van der Heijden (2017) showed that the relationship between the organizational climate for innovation and organizational performance is mediated by the innovative behaviour. Other studies showed that performance measurements can be used to boost employee initiatives to improve operational performance (Groen, Wouters, and Wilderom, 2012).

Hence, a solution to deal with organizational innovation is to develop the creativity and the personal innovation potential of the people that a company employs. The employees’ new ideas can make process improvements within a company, but their creativity does not happen automatically, thus it is necessary to study what kind of variables influence them. As it was studied in recent papers, creative people have many ideas but they do not have initiative to develop them and to make them happen, therefore the management company must intervene and change their behaviour and way of thinking and acting in this specific direction.

Taking into consideration that employees are valuable resources within an organization, especially when referring to the innovative part (De Clercq, Dimov and Belausteguigoitia, 2017), continued engagement and support could be achieved by looking for effective ways to reward their contributions, loyalty, dedication and efforts (Caruth and Handlogten, 2002).

There are some studies that presented different factors that can affect employee performance and organizational innovation, such as: working conditions, worker-employer relationship, job security and company over all policies and procedures for rewarding employees (Hafiza et al., 2011; Carraher, Gibbson, and Buckley, 2006).

Although literature suggested that providing intrinsic employee rewards had the potential to enhance creative performance (Amabile, 1996), many managers continued to emphasize the use of external rewards, such as incentives and monetary recognition (Baer, Oldhama, and Cummings, 2003).

Therefore, if the company wants to improve its organizational performance, it is imperative for the company and its managers to understand what motivates employees and apply certain practices to reward and make them more motivated (Lee and Raschke, 2016).

Most of the research papers analysed the relationship between organizational performance and employee motivation (Kuranchie-Mensah, and Amponsah-Tawiah, 2016; Lee and Raschke, 2016; Zámečník, 2014), but there are still many gaps between personal or organizational innovation and the motivation or rewarding of creative employees.

Methodology

The aim of this paper is to analyse the mediating role of the policy of rewarding creative employees on the relationship between the personal innovation potential and organizational innovation. In this regard, the authors identified 3 variables: personal innovation potential (PIP), organizational innovation (OI) and policy of rewarding creative employees (R).

This study is an exploratory one, with a sample of 56 people. For collecting the data, it was used a questionnaire containing 22 items, measuring the perceptions of the respondents. The data were collected in June, the questionnaire being addressed to students from the master programs of University POLITEHNICA of Bucharest, people working in Bucharest, Romania. Except the control variables, all the variables were measured on a 7-point Likert-type scale ranging from 1 (strongly disagree) to 7 (strongly agree). In this study, the authors developed three hypothesis and tested them using survey data.

Hypothesis 1 (H1): Personal innovation potential will positively affect the level of the organizational innovation.

Some studies (e.g. Shanker et al., 2017) showed that there is a relationship between the organizational climate for innovation, organizational performance, and the innovative behaviour, which is why the authors wanted to test if personal innovation potential will positively affect the level of the organizational innovation.

Hypothesis 2 (H2): Personal innovation potential is positively influenced by the level of the policy of rewarding creative employees.

Hon and Lui (2016) presented in their paper that creativity is often considered the first step for innovation. They also argued that creativity and innovation should not be separated, but rather combined to “reveal an organizational phenomenon of immense innovation”. Baer et al. (2003) presented in their paper that there are some studies showing positive effects of external rewards on creativity, some that have negative effects, while other studies showed that extrinsic rewards have poor or negligible effects on the creativity of individuals. Hence, it is important to test if personal innovation potential is positively influenced by the level of the policy of rewarding creative employees.

Hypothesis 3 (H3): A high level of the policy of rewarding creative employees determines an increase in the level of organizational innovation.

Some research papers (Kuranchie-Mensah, and Amponsah-Tawiah, 2016; Lee and Raschke, 2016; Zámečník, 2014) demonstrated that there is a relationship between extrinsic motivation and organizational performance. Taking into consideration that organizational innovation conducts to organizational performance (Fu et al., 2015), the authors wanted to test if a high level of the policy of rewarding creative employees determines an increase in the level of organizational innovation.

Conceptual framework

The conceptual framework is presented in Figure 1, the independent variable being represented by personal innovation potential, while the dependent variable is represented by organizational innovation. The control variables used in this study are: gender, age, position of the employees, and domain of activity. The three main identified constructs were averaged to obtain a simple value for each variable.

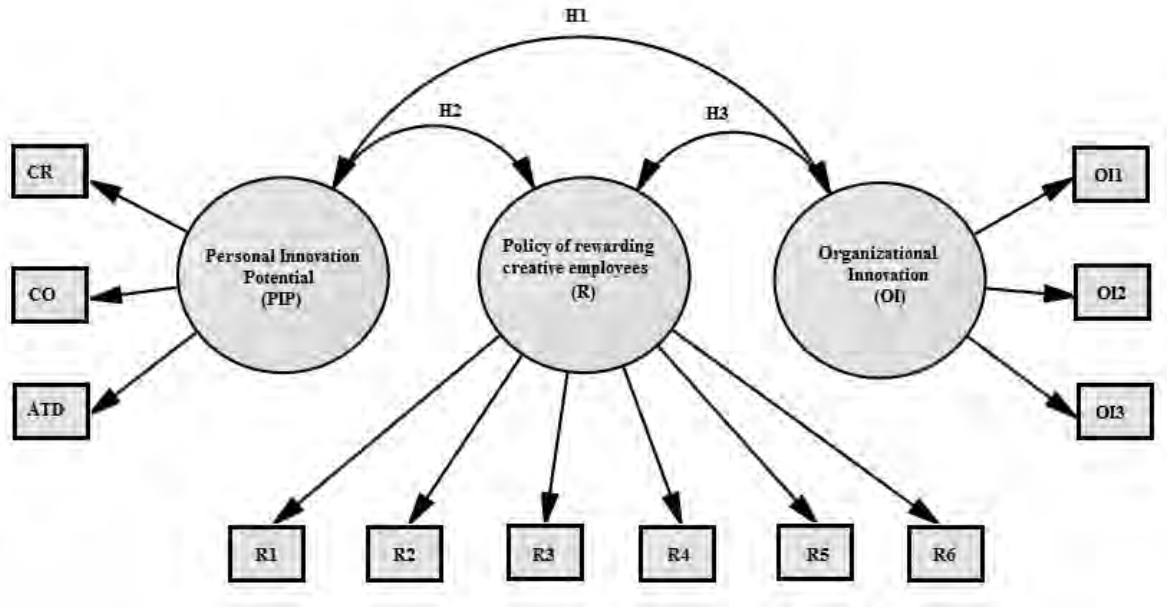

Figure 1: Conceptual Framework

For the first construct, Personal innovation potential (PIP), the authors used a part of the way that Miron, Erez and Naveh (2004) measured the innovative performance through some personal characteristics, such as: creativity (CR), attention-to-detail (ATD), and conformity (CO). All of these variables were obtained by averaged other items (as it can be seen in Table 1)

Table 1. Variables and their codes

Codes	Variables
PIP=(CR+CO+ATD)/3	**PERSONAL INNOVATION POTENTIAL**
CR= (CR1+CR2+CR3)/3	**Creativity**
CR1	I think I have a lot of creative ideas.
CR2	I prefer activities that allow me to think creatively.
CR3	I prefer to do things in an original way.
CO=(CO1+CO2 +CO3)/3	**Conformity**
CO1	I try not to oppose team members.
CO2	I adhere to accept rules in my area of work.
CO3	I adapt myself to the system.
ATD=(ATD1+ATD2)/2	**Attention-to-detail**
ATD	I perform the tasks precisely over a long time.
ATD	I am good in tasks that requires dealing with details.
R= (R1+R2+R3+R4+R5+R6)/6	**POLICY OF REWARDING CREATIVE EMPLOYEES**
R1	Employees who make innovative contributions to the company should be rewarded with worth recognizing in front of their colleagues (intrinsic motivation).
R2	Employees who make innovative contributions to the company should be rewarded by giving them a percentage of the earnings resulted from implementing the idea.
R3	Employees who make innovative contributions to the company should be rewarded by giving them a salary increase.
R4	Employees who make innovative contributions to the company should be rewarded by giving them a flexible work schedule.
R5	Employees who make innovative contributions to the company should be rewarded by giving them a reward in products / services.
R6	Employees who make innovative contributions to the company should be rewarded by giving them vacation days.
OI=(OI1+OI2+OI3)/3	**ORGANIZATIONAL INNOVATION**
OI1	The company I work in is innovative in terms of product / service development.
OI2	The company I work in is innovative in terms of product / service improvement.
OI3	The company I work in is innovative from the point of view of process improvement.

For the second construct, Policy of rewarding creative employees (R), the authors conducted some interviews with 3 employees (one from a service company, one from a manufacturing company and one from an industrial company) about what they thought companies should do in order to motivate them. By analysing their responds, the authors discovered six main methods of motivating and rewarding employees, variables that were then used in this study (variables R1, R2, R3, R4, R5, and R6).

The third construct, Organizational innovation (OI) was measured by the following indicators: developing new products/services (OI1), developing the products/services of a company (OI2), developing the process of a company (OI3).

Results

SPSS 20.0 software was used to analyse data for this paper. There were 56 respondents, the majority of them being female (75 percent), while 11.2 percent of the respondents had more than 30 years old.

In Table 2 it can be observed that there is a positive correlation between the personal innovation potential and organizational innovation (R=0.508, p<0.01), hypothesis 1 being confirmed. Creative people are important resources in a company, and they can help develop the company on all levels. Therefore we can say that a high level of personal innovation potential leads to a high level of organizational innovation.

Table 2: Correlation matrix among variables

Correlations

	PIP	R	OI	CR	CO	ATD	R1	R2	R3	R4	R5	R6	OI1	OI2	OI3
PIP	-														
R	**0,401****	-													
OI	**0,508****	**0,508****	-												
CR	0,581**	0,297*	0,480**	-											
CO	0,792**	0,301*	0,288*	0,130	-										
ATD	0,799**	0,275*	0,339*	0,144	0,585**	-									
R1	0,151	0,581**	0,409**	0,120	0,095	0,114	-								
R2	0,498**	0,607**	0,355**	0,400**	0,333*	0,350**	0,149	-							
R3	0,576**	0,528**	0,374**	0,240	0,409**	0,600**	0,145	0,606**	-						
R4	0,179	0,762**	0,277*	0,148	0,165	0,078	0,185	0,339*	0,179	-					
R5	0,200	0,743**	0,256	0,319*	0,025	0,093	0,345**	0,387**	0,335*	0,481**	-				
R6	0,200	0,769**	0,366**	0,082	0,288*	0,065	0,246	0,261	0,201	0,768**	0,474**	-			
OI1	0,347**	0,370**	0,410**	0,298*	0,135	0,322*	0,055	0,261	0,295*	0,335*	0,257	0,344**	-		
OI2	0,414**	0,507**	0,713**	0,436**	0,250	0,217	0,395**	0,383**	0,362*	0,267*	0,244	0,389**	0,107	-	
OI3	0,224	0,134	0,708**	0,197	0,158	0,132	0,287*	0,070	0,092	-0,012	0,029	0,024	-0,141	0,250	-

Note. N=56, *p <0.05, **p<0.01

Between personal innovation potential and the policy of rewarding creative employees is a moderate positive correlation (R=0.401) that is significant at 0.01 level (2-tailed). Taking into account that this is an exploratory study, we could say that hypothesis 2 is confirmed.

Also, in Table 2 it can be observed that the policy of rewarding creative employees and organizational innovation are positively correlated (R=0.508, p<0.01), hypothesis 3 being also confirmed. Thus, if the company would apply different rewards for creative people then the level of the organizational innovation would be improved.

On one hand, there are some positive correlations between organizational innovation and different types of reward for creative employees, such as: worth recognition in front of the colleagues (R=0.409, p<0.01), percentage of the earnings (R=0.355, p<0.01), salary increase (R=0.374, p<0.05), and vacation days (R=0.366, p<0.01). On the other hand, there are some positive correlated relationships

between personal innovation potential and percentage of the earnings (R=0.498, p<0.01), and salary increase (R=0.576, p<0.01).

The authors found out that these rewarding practices are different depending on the gender of the employee. In Table 3, there are presented the percent of employees that agree and strongly agree that using different rewarding practices is important for the good functioning of the company. By analysing the respondents' answers, we identified that all of the interviewed employees consider that offering a salary increase is the best way a company could reward the creative employees. The second favourite reward is represented by a percentage of the earnings resulted from implementing creative ideas. The least favourite rewards were represented by the intrinsic reward, and the flexible work schedule.

Table 3. Different ways to reward creative employees by gender

		Gender			Ranking		
		Female (%)	Male (%)	Total (%)	Female	Male	Total
R1	Agree and strongly agree	53,57	14,29	67,86	2	3	5
R2	Agree and strongly agree	66,07	17,86	83,93	1	2	2
R3	Agree and strongly agree	66,07	21,43	87,50	1	1	1
R4	Agree and strongly agree	44,64	21,43	66,07	4	1	6
R5	Agree and strongly agree	53,57	17,86	71,43	2	2	4
R6	Agree and strongly agree	51,79	21,43	73,21	3	1	3

Taking into consideration the differences existed by gender, we found out that for female employees the financial rewards are the most important, followed by the recognition of their merits in public. For the male employees, financial reward and flexible work schedule are the most important, while they do not need anyone else to praise them in public.

Discussion and conclusions

Our exploratory study shows how policy of rewarding creative employees affects personal innovation potential and organizational innovation. Both the company management and business owners need to understand the role of rewarding employees and to what practices are they the most sensitive, in order to stimulate employees' creativity and to improve the organizational innovation level. The authors found out that these rewarding practices are different depending on the gender of the employees, financial rewards being important for both males and females. For women, the worth recognition in front of their colleagues is also very important, while for males the flexible work hours are priority.

The current study in not without limitations. First, the majority of the respondents was represented by females and we observed that female employees have different preferences than male employees, which is why if their proportion would have been equal, then the results of the mediating role would have probably been different. Second, only 15 types of companies were analysed in our study, most of them being in domains such as: banking and finance (21.4 percent), IT (12.5 percent), audit and consulting (12.5 percent), and automotive (10.7 percent). Third, we used for this study only the perceptions of surveyed people, 87.5 percent of them having an executive position within the company.

In the future, in order to see if the relationships between the personal innovation potential, the organizational innovation, and the policy of rewarding creative employees, identified in our exploratory study, were representative for the Romanian population, the authors will continue this study by analysing a larger group of companies from Romania, making two separate researches: one on employees and one on managers.

References

Amabile, T. M.
1996
“Creativity in context” Boulder, CO: Westview Press.
Anderson, N., Potocnik, K. and Zhou, J.
2014
“Innovation and Creativity in Organizations: A State-of-the-Science Review, Prospective Commentary, and Guiding Framework”, In Journal of Management, 40 (5), pp. 1297-1333
Baer, M, Oldhama, G. R., and Cummings, A.
2003
“Rewarding creativity: when does it really matter?”In The Leadership Quarterly, 14, pp. 569–586
Carraher, R., Gibson, A., & Buckley, R
2006
“Compensation in the Baltic and the USA”, In Baltic Journal of Management, 1, 7-23.
Caruth, D.L., & Handlogten, G.D.
2002
“Compensating Sales Personnel”, In The American Salesman, 6-15.
Cummings, A., and Oldham, G.R.
1997
“Enhancing Creativity: Managing Work Contexts for the High Potential Employee” In California Management Review, 40(1)
De Clercq, D., Dimov, D. and Belausteguigoitia, I.
2017
“Perceptions of Adverse Work Conditions and Innovative Behavior: The Buffering Roles of Relational Resources” In Entrepreneurship Theory and Practice, 40 (3), pp. 515 - 542
Fu, N., Flood, P.C., Bosak, J., Morris,T., and O'Regan, P.
2015
"How do high performance work systems influence organizational innovation in professional service firms?" In Employee Relations, 37 (2), pp.209-231
Groen, B.A.C., Wouters, M.J.F., and Wilderom, C.P.M.
2012
“Why do employees take more initiatives to improve their performance after co-developing performance measures? A field study” In Management Accounting Research, 23, pp.120– 141
Hafiza, S.N., Shah, S.S., Jamsheed, H., & Zaman, K.
2011
“Relationship between rewards And employee’s motivation in the non-profit organizations of Pakistan”, In Business Intelligence Journal, 4 (2), 327-329.
Hon, A. H. Y.
2012
“Shaping environments conductive to creativity: The role of intrinsic motivation”, In Cornell Hospitality Quarterly, 53 (1), pp. 53-64.
Hon, A.H.I., and Lui, S.S.
2016
“Employee creativity and innovation in organizations: Review, integration, and future directions for hospitality research", In International Journal of Contemporary Hospitality Management, 28 (5), pp.862-885
Janssen, O., Van de Vliert, E. and West, M.
2004
“The bright and dark sides of individual and group innovation: A special issue introduction”, In Journal of Organizational Behavior, 25 (2), pp. 129-145
Kuranchie-Mensah, E.B., and Amponsah-Tawiah, K.
2016
“Employee motivation and work performance: A comparative study of mining companies in Ghana” In Journal of Industrial Engineering and Management, 9(2), pp. 255-309
Lee, M.T., and Raschke, R. L.
2016
“Understanding employee motivation and organizational performance: Arguments for a set-theoretic approach” In Journal of Innovation & Knowledge, 1 (3), pp. 162-169

Miron, E., Erez, M., and Naveh, E.
2004
“Do personal characteristics and cultural values that promote innovation, quality, and efficiency compete or complement each other?” In Journal of Organizational Behavior, 25, 175–199
Scott, S. G. and Bruce, R. A.
1994
“Determinants of innovative behavior: A path model of individual innovation in the workplace”, In Academy of Management Journal, 37 (3), pp. 580-607
Shanker,R., Bhanugopan,R., van der Heijden, B.I.J.M., and Farrell,M.
2017
“Organizational climate for innovation and organizational performance: The mediating effect of innovative work behavior” In Journal of Vocational Behavior, pp. 67-77
Tajeddini, K. and Trueman, M.
2008
“Effect of customer orientation and innovativeness on business performance: a study of small-sized service retailers” In International Journal of Entrepreneurship and Small Business, 6(2), pp. 280-295.
Zámečník, R.
2014
“The measurement of employee motivation by using multi-factor statistical analysis” In Procedia - Social and Behavioral Sciences, 109, pp. 851 – 857; Paper presented at the 2nd World Conference On Business, Economics And Management -WCBEM 2013

BIBLIOGRAPHIC STUDY ON THE WORK PRODUCTIVITY MEASUREMENT IN PUBLIC ADMINISTRATION

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Abstract

Purpose *– The purpose of the article is to define the concept of work productivity in public administration, to identify the measurement methods, based on a bibliographic study of the recent approaches in the field.*

Methodology/approach *– The methodological plan of the paper consists in consultation of specialized literature and, based on the bibliographic study, three research directions were established, determining the set of objectives and identifying concepts, methods and methodologies for each of them.*

Findings *– Following the bibliographic study, on each research direction, was observed that the literature presents some limitations in the direction of empirical studies on measurement of labour productivity in public administration, the subject matter of the research being treated only theoretically.*

Research limitations/implications *- The limitations of this research consist of creating a methodology to research, based on the bibliographic study, which will underpin the subsequent qualitative and quantitative analyses.*

Practical implications *- In the future, the application of the methodology serves to create a management model that can successfully contribute to the administrative reform process. The pragmatic goal is to determine the methods of increasing labour productivity in public administration.*

Originality/value *- This article highlights the role of measuring labour productivity in public administration because knowledge of the results can lead to making the right decisions for achieving the institutional goals.*

Key words: *public administration, work productivity, measurement*

Introduction

In public sector and in public administration, in special, the measurement of labour productivity is difficult to achieve due to the lack of data necessary for estimating productivity, data on labour outcomes, quantity, quality and price. In the literature (Atkinson, 2005) (Simpson, 2009), is debated the situation of collective services, where it is difficult to identify the real nature of production, but also the case of health services when the value of these services cannot be estimated from the beneficiary's perspective.

Measuring labour productivity is an important measure of the institution's performance to ensure that the best possible decisions are made and the efficient allocation of public finances (Chan, Francia & Porter, 2010) but without reducing the performance of an institution to a simple measurement of financial results (Carrilo & Batra, 2012). For public managers, the measurement and analysis of labour productivity determine the understanding of the effects of market performance on living standards (Mungiu-Pupăzan & Vasilescu, 2011).

Evaluating and analysing labour productivity in the public sector is difficult to achieve due to the non-standardized way of collecting data on service activities, but also to a lack of correlation between the assessment of work and its results. Current methods of measuring labour productivity are controversial because they present partial images without giving a clue, for example, about the

intensity of capital use. It must keep in mind that the performance of intellectual work is difficult to measure on the basis of objective criteria (El-Farr, 2009). It is necessary to analyse the elements of differentiation of intellectual work compared to physical work (Despres & Hiltrop, 1995), the way of organizing intellectual work (Drucker, 1999) or the correlation between labour productivity and the level of professional training of employees (Mungiu-Pupăzan & Vasilescu, 2011).

Methodology

The methodological framework of the paper is the consultation of the specialized literature, on the basis of which three main research directions have been identified which require a thorough approach, namely:

1. Identification and analysis of the methodology of calculating labour productivity in public administration
2. Research on the correlation between labour productivity and factors of influence
3. Analyzing the Impact of Increasing Labour Productivity on Human Resources Management

The methodology of the bibliographic study involves identifying and approaching the source of documentation, identifying the bibliographic content, structuring the bibliographic referential on the directions and objectives of the research, evaluating the bibliographic reference according to the needs of the research.

The content analysis of a number of previous articles, published in prestigious journals, allowed identifying concepts, methods and analysis methodologies. In accordance with each research direction, objectives and phases have been set out, which outlined a research model as follows:

For the research direction "Identification and analysis of the methodology of calculating labour productivity in public administration" we aim at identifying the specific characteristics of calculating and analysing the productivity of labour in public administration.

The proposed research stages are:

a) Designing a bibliographic research model,
b) Bibliographic research on the current state of knowledge in the field of measuring and analysing the productivity of intellectual work in public administration,
c) Highlighting the differences between physical work and intellectual work, the specifics of intellectual work in public administration

At the end of this stage, the remarkable differences between physical and intellectual work will be identified, the specifics of labour productivity in the public sector, the current methods of evaluation and analysis of the productivity of intellectual work in public administration

The second research direction "Research on the correlation between labour productivity and factors of influence" has as specific objectives the identification of the factors that influence labour productivity at the level of the public administration and then the analysis of the correlations between the labour productivity and the identified factors.

In order to achieve the objectives, the following steps are to be taken:

a) Identification of factors of influence on labour productivity in public administration and correlation
b) Development of a research tool
c) Selection and description of the sample
d) Data collection
e) Qualitative and quantitative analysis of the data collected
f) The synthesis of the obtained information.

At the end of this stage, based on qualitative and quantitative research using tools such as the interview and questionnaire, multivariable or multi-level statistical analyses will identify those dimensions that influence the dynamics of labour productivity.

The last research direction "Analysis of the Impact of Increasing Labour Productivity on Human Resources Management" has as specific objectives: creating a model for evaluation and analysis of labour productivity in public administration and determining the impact of applying the proposed model on human resources management in public administration.

In order to achieve the objectives it is necessary to take the following steps:

a) To analyse the human resources evaluation systems in the public administration
b) To design a model for the evaluation and analysis of labour productivity, structured as a working tool for managers
c) To determine the impact of productivity growth work on public service activities

We conclude that the bibliographic study follows the research objectives proposed on each of the three identified research directions.

Findings

The concept of labour productivity is analysed from various perspectives, most studies defining it as the ratio between the volume of goods or services and the expenses related to they are obtaining (Manoilescu, Barre, 1970, Isfănescu, Tudorache, 2013). The Productivity Report of New Zealand, published in March 2018, defines productivity as the institutional capacity to use the same resources (inputs - goods, capital and human resource) to produce better quality public services (outputs), so productivity is the measure of efficiency.

Measuring and analysing labour productivity determines the impact of market performance on living standards (Mungiu-Pupăzan & Vasilescu, 2011), an idea also found at Pekkola & Linna (2010), which considered that the economic performance of a state is influenced of the public sector productivity, by an important measure. In the same direction are other approaches from the literature (Cosseddu, Paolo, Cozzolino, Maria, Felli, Ernesto Lorenzo,) according to which the productivity in the public sector must be measured in order to provide an approximate evaluation of the potential benefits of reforms.

Several methods and models of productivity measurement are presented in the literature. In the service sphere, measuring productivity is an old challenge, with only a few methods proving its effectiveness in practice (McLaughlin & Coffey, 1990). To obtain values that can be used in quantitative analyses, Faulkner and Kaufman (2017) propose measuring the value each institution in the administrative system, that contributes to the society of which it is a part, with the relevant involvement of stakeholders in the process of developing and implementing productivity measurement Schulz, Sense and Pepper (2017). Jaaskelainen and Lonnqvist (2009) recommend an initial identification of tangible and intangible components of productivity, and then design a model to reflect these components.

Specialized literature associates the process of measuring labour productivity with a number of factors that have a considerable influence on labour productivity (Mungiu-Pupăzan & Vasilescu, 2011, Toduţă, 1975). A brief enumeration of these factors would be:

a) tangible and intangible technology
b) the correlation with the economic cycle
c) the standardization of processes
d) the qualification level of the human resource
e) efficiency
f) organizational management

The concept of intellectual work is addressed in the literature in terms of the elements of differentiation of intellectual work compared to physical work (Despres & Hiltrop, 1995). Other researchers (Drucker, 1999, Kogan & Muller, 2006) highlighted the importance of organizing intellectual work, employees being responsible for identifying work tasks, they create their own strategies, processes and working techniques that are generally distinct from those organizational, in order to capitalize on their knowledge. Kinsey (2007) pointed out that intellectual work is characterized by significant dynamics, this category of employees being under pressure to keep up with this dynamics. Analysed from the perspective of the possibility of quantification, most researchers agree that intellectual work is difficult to measure on the basis of objective criteria (El-Farr, 2009, Abăluţă, 2004). The results of intellectual work are mostly abstract, depending on the level of knowledge of employees to ensure the achievement of organizational goals.

The concept of labour productivity in the public sector is less common (Maroto & Cuadrado, 2009), the measurement of this indicator being difficult to achieve because of the lack of data necessary to estimate productivity, data on labour outcomes, quantity, quality and price. In the literature (Atkinson, 2005) (Simpson, 2009), there is presented a situation of collective services, defence or public order, where it is difficult to identify the real nature of production, but also the case of health services when the value of these services cannot be estimated from the perspective of the beneficiaries.

Productivity measurement is an important quantification of the institution's performance to ensure that good management decisions are made and that funds are allocated efficiently. (Chan, Francia, & Porter, 2010) Relevant results of the labour productivity analysis are obtained using a system of indicators that allow comparative research of the current results with the previous ones without causing some "deformations of the dynamics of production" (Radu, 2004). The evaluation of the whole set of internal relations and processes of the public institution determines the promotion of quality management (Raboca, 2010), the basis for providing quality services for citizens.

Currently, measurement of productivity in public administration through the use of results-based methods has been introduced in countries such as Australia, Finland, New Zealand or the United Kingdom (Lau, Lonti, & Schultz, 2017). In 2017, in the case of collective services, where the identification of the results is difficult, the input method was used in many countries of the European Union. For the measurement of results and the use of the results method in the calculation of productivity, the evolution of the quality of public services can be analysed. There are four states in Europe (Hungary, Ireland, Slovakia and the United Kingdom) that monitor the evolution of public service quality in terms of results, while New Zealand is monitoring the evolution of input quality.

Discussion and conclusions

The bibliographic study aimed at identifying how to measure labour productivity in public administration, given that the results of work are intangible goods or services. It has been found that measuring productivity in public administration faces a difficulty in measuring accurately the results.

Following the literature, we conclude that public administration should take into account the correlations between the number of services rendered and their quality as well as the correlation between the increase of the number of public services and the new technologies introduced in the activity. However, the literature does not reflect an effective way of measuring labour productivity in public administration, so that public managers can use it in day-to-day work.

The purpose of this research is the development of a research methodology based on a bibliographic study to underpin future qualitative and quantitative analyses. A limitation is the creation of a framework for measuring labour productivity only at the theoretical level, without having developed an empirical methodology that is accepted internationally. Therefore, future research will create the theoretical framework, with practical validation being done concurrently.

References

Abăluță, O.
2004
”Importance of Productivity in the Public Sector” in Administration and Public Management: 108-114. Bucharest
Atkinson, T.
2005
"Measurement of Government Output and Productivity for National Accounts" In Atkinson Review: Final Report, Basingstoke: Hampshire.
Bărbulescu Tudorache, A., and Bărbulescu Tudorache, M
2013
"Effective Use of Production Factors" in Romanian Statistical Review, 287
Bercu, A.M.
2013
“Public Management Strategies”, Bucharest, Tritonic Books
Chan, L., Francia, A., and Porter, M.
2010
“The Impact of Multiple Work Arrangements on Labour Productivity” In Journal of Economics and Education Research, 11: 35-57.
Corsi, M. and D’Ippoliti, C.
2013
“The Productivity of the Public Sector: a Classical View.” In PSL Quarterly Review, vol.66, n.267, 403-434
Despres, C., and Hiltrop, J.M.
1995
"Human Resource Management in the Knowledge Age: Current Practice and Perspective on the Future." In Employee Relation, 17(1): 9-23.
El-Farr, H.
2009
"Knowledge Work and Worker: a Critical Literature Reviews." In Working Paper Series.
Faulkner, N., & Kaufman, S.
2017
“Avoiding Theoretical Stagnation: A Systematic Review and Framework for Measuring Public Value.” In Australian Journal of Public Administration, 77(1), 69-86.
Grönroos, C.
2001
A Service Quality Model and its Marketing Implication” In European Journal of Marketing, vol.18. no.4, 36-44
Hatry, H.
2010
“Looking Into the Crystal Ball: Performance Management Over the Next Decade.” In Public Administration Review, 70, 208-211.
Helen, S.
2008
“Productivity in the Public Sector.” In Journal of Economic Survey, 250-276.
Kinsey, C.
2007
"The hoarding/sharing instinct." In KM Review, 9(6): 6-6.
Kwon, M., & Jang, H.
2011
“Motivations Behind Using Performance Measurement: City-Wide vs. Selective Users.” In Local Government Studies, 37, 601 - 620.
Lau, E., Lonti, Z. and Schultz, R.
2017
“Challenges in the Measurement of Public Sector Productivity in OECD Countries” In International Productivity Monitor, 180-195
Mungiu – Pupăzan, M. and Vasilescu, M.
2011
„Productivity – a Way of Expressing Economic Performance and Efficiency.” In Annals of ”Constantin Brâncuși” University of Economics, 3, 121-131

Pekkola, S., and Linna, P.
2010
”Defining and measuring productivity in the public sector: managerial perceptions.” In International Journal of Public Sector Management, 23: 479-499.
Raboca, H.
2013
”Quality Management in Public Administration.”, Bucuresti, Tritonic Books
Radu, P.
2004
"Increasing Labor Productivity, a Condition for the Viability and Competitiveness of the Enterprise", Iași, Sedcom Libris
Rotaru, P. C.
2013
“A regional model for labour demand in Romania.” In Theoretical and Applied Economics, XX No.8(585), 4-10.
Sallis, E.
2005
”Total Quality Management” in Education. London: Koga Page Ltd.
Schulz, R., Sense, A., & Pepper, M.
2017
“Conceptualising a Framework for Effective Performance Measurement in Cultural Precinct Development and Operation.” In Australian Journal of Public Administration, 77(1), 35-49.
Simpson, H.
2009
”Productivity in Public services” In Journal of Economic Surveys, 32 (2), 250-276
Ștefănescu, A., Dobrin, C., Calu, D., & Țurlea, E.
2010
“Controversies on Measuring the Performance of Public Administrations in Romania.” In Transylvanian Journal of Administrative Sciences, 1 (25), 225-242.
Toduță, G.
1975
“Planning and Analysis of Labour Productivity in Industry”, Timisoara, Facla
Thornhill, D.
2006
”Productivity Attainment in a Diverse Public Sector” In Institute of Public Administration Seminar on Promoting Productivity in a Diverse Public Sector
Van Dooren, W., Lonti, Z., Miekatrien, S.& Bouckaert, G.
2007
“Institutional drivers of efficiency in the Public Sector. OECD.”
Wakefield, K., & Blodgett, J.
1999
“Customer response to intangible and tangible service factors.” In Psychology and Marketing, Vol.16 No1, 51-68.

PERFORMANCE MANAGEMENT AND ETHICS IN ORGANIZATIONS

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Abstract

Purpose *– The purpose of the paper is to present the perspective of the Romanian and European entrepreneurs with respect to the level in which the organizations take into account the ethical aspects, the values that they have, and the use of different tools for the ethical construction of a performant organization.*

Methodology/approach *- A quantitative research using boring and the questionnaire as the research's instrument.*

Findings *– A conclusion of the two quantitative researches, representative only in the two samples investigated, is that ethics is beginning to play an increasingly important role in Romanian affairs (or at least declaratively it must play an increasingly important role). Unfortunately, the investigated Romanian organizations do not yet have ethical codes in a satisfactory percentage, with no ethical representatives. The European organizations investigated are one step ahead of those in Romania, but there are still many gaps here, many changes that need to be made so that these organizations become conformed to the 21st century.*

Research limitations/implications *– The number of entrepreneurs that have been investigated is 74 from 12 different European countries and 331 organizational subjects from Romania, which does not allow an extrapolation of the results with a certain probability and a limited error.*

Practical implications *– An unethical business behavior destroys the relationship between the parties involved in the market, thus integrity is crucial for transactions, even at micro-economic, national level.* As an organizational priority, ethics will not only influence the decision-making process, but also the organizational culture. In order to create and develop an ethical organization, there has to be a process of alignment that will integrate business ethics in the mission, vision, strategy and objectives of the organization.

Originality/value *–The ethical behavior is a central topic for the performance management. This paper contributes to a broader view on the relationship between performance management and ethics by emphasizing the role that values are playing within the organization as well as the use of different tools for the ethical construction of a performant organization.*

Keywords: *business ethics, performance management, ethical tools.*

Introduction

This paper comes to complete some previous articles that have published, presenting step by step the results obtained within two quantitative researches focused on Romanian organizations as well as European ones, underlining the notable similitudes and differences, without pretending that they can be generalized due to the lack of a proper and comparable methodological frame in the investigated universe. The same questionnaire has been used as research instrument in both studies, including different types of questions: open as well as closed ones.

The topics addressed approach the level in which the organizations take into account the ethical aspects, the values that they have, and the use of different tools for the ethical construction of a performant organization. Ethics has become one of the priorities of an organization. In the 21st

century, ethics is not a luxury, nor an option. Within the society there can be noticed selfish and irresponsible actions that make some poor and other rich [Brimmer, 2007].

Until now, the business ethics specialists had to deal with the statement that business ethics represents the perfect oxymoron. Still there are companies that have an ethical, profitable program. These companies, as many others, have showed an entire history in the field of an exemplary ethical climate, as well as profitable operations [Blaga, 2011, PhD thesis].

The empirical studies regarding the relationship between performance, profitability and ethics at the organization's level have showed mixed results. There is nowhere to be found a negative correlation between the ethical behavior of a company and profit, on the contrary, the companies that have an ethical behavior act better on the market [Cordos, R.C., Blaga. B.L., 2012].

Exchange efficiency on the market is "facilitated by vendor ethics and buyers' attention" [Tsalikis, Seaton, 2006, p.318]. This behavior at the micro level also manifests itself in macroeconomic performance.

As Fullerton (1996) and others noted, "the ethical behavior of the parties involved is a premise of market effectiveness...The unethical behavior of the parties destroys the relationship between them and causes unproductive and ineffective changes."

The hypothesis of the research

Starting from the issue that has to be studied, a series of hypothesis can be elaborated [Bacali et al., 2010, p. 279-280].

H01: Clients' satisfaction is the main value for an organization.

H02: The main value within the organization is at present the concern for its profitability.

H03. The majority of the investigated persons believe that ethics definitely influences the financial performances of the organization.

H04: At most 25% of the organizations surveyed have people with specific responsibilities for ethical issues.

H05: In most of the investigated organizations which have persons responsible with ethical issues there is at most one person with such responsibilities.

H06: At most 25% of the organizations surveyed have a code of ethics.

H07: At most 25% of the organizations surveyed have an ethics committee.

H08: The main activity of the ethics committee is to analyze intimations regarding ethics violations.

H09: The main change needed is to develop an ethics code in the organization.

H10: The main reaction of employees to changes in ethics in the organization would be reluctance.

The instrument of the research

The method that has been used within this research was the boring, and the instrument was the questionnaire.

For the questionnaire, different types of questions have been used [Bacali et al., 2002, p. 31-32]: open questions (addressed to the active process of the subject's memory, verifying and testing what is stable, consolidated in the behavior and knowledge of the subject) and closed questions (dichotomic, multidichotomic and scale responses).

For the elaboration of the questionnaire, the following basic principles have been respected:

- the question should be as short as possible, meanwhile clear and concise;
- the question should be elaborated in such a way that it is avoided a predisposition of the subjects to offer a certain answer;
- the ability of the subjects to answer certain questions has to be taken into account; and
- the question should not be threatening or unpleasant.

The sampling

Due to the statistical, organizational, financial and informational restrictions the dimension of the sample was 74 organizational subjects from 12 different European countries and 331 organizational subjects from Romania. A non-aleatory sampling has been used, based on accessibility, which means that there were investigated those members of the community that were able to be approached in a more facile way, thus we cannot talk about a representative sample, the conclusions referring only to the investigated sample, without extrapolating them.

The results of the research

Questioned about the first five values considered to be as the most shared and frequently used within the organization, with respect to the current situation, the respondents from the Romanian and European organizations have set in the first place the value of assuming the responsibility for the consequences of their own decisions and actions, whereas the second place refers to the customer satisfaction (for the Romanian organizations) and the support given by the organization for the continuous improvement of the employees knowledge and abilities (for the European organizations). [Cordos, R.C., Blaga, B.L., 2017a]

There can also be noticed the presence of ethical behavior for the employees as well as the entire organization as a value in the European organizations, as well as the strong belief that clients' satisfaction is one of the most important concerns for the Romanian organizations.

It depends on how we interpret this statement: "Our client, our master". If we refer to the interior of the business, there are many factors which motivate us besides money: personal or professional development, the opportunity to work in a certain organization, the pleasant working environment. No matter of the received stimulants, no employee likes to have to deal with an inequitable behavior or the lack of respect. And this is true for every person, no matter if he is a simple worker or a general manager. [Cordos, R.C., Blaga, B.L., 2017a]

According to Maslow's pyramid, we are all trying to be noticed, to climb the hierarchical scale, and this cannot be reached while we have the mentality of a subordinate.

If we refer to the exterior of the business, the client usually judges after a first impression. As long as the client feels that there is a submitted person in front of him, he will try to make it his advantage no matter what. [Cordos, R.C., Blaga, B.L., 2017a]

Probably the optimum variant is the statement "to sell is easier when you are trying to make friends. It is easier to buy from a friend, because he can answer different questions. The trust is higher in this case.

Thus, it is not enough to offer a client just good prices and quality products, it is also required to really care for him, to respect him, to treat him as you would like to be treated. Thus, the situation becomes profitable for both sides on long term, meaning to have an ethical behavior as an individual and as an organization.

Analyzing the answers given to another question it can be noticed that in most of the cases the respondents believe that ethics certainly influences the financial performances of the organization (54% in Romania and 40% in Europe) or probably influences such performances (35% in Romania and 32% in Europe). [Cordos, R.C., Blaga, B.L., 2017b]

Although at first sight there is no incompatibility between ethics and profit, however it is possible that ethics isn't directly linked with the financial performance of an organization. What's for sure is that ethics can improve the organization's situation from a double standpoint: productivity and relationship with partners and competitors.

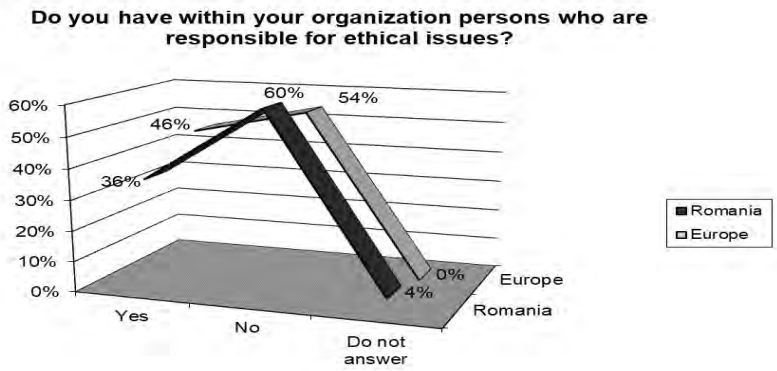

Fig. 1. Comparative analysis regarding the existence of persons responsible with ethical issues within the investigated organizations in Romania and Europe

60% of the investigated Romanian organizations and 54% of the European ones don't have designated persons responsible with ethical problems. There may be some greater interest from the side of the foreign respondents, where there is no non-response, while there are 4% of the investigated Romanian subjects who do not answer this question.

Questioned about the number of people who have such responsibilities, most of the organizations responded that they have one person in both Romanian and European organizations.

Fig. 2. Comparative analysis regarding the existence of an ethics code within the investigated Romanian and European organizations

54% of the investigated European subjects state that the organizations they are part of have developed a code of ethics, compared with only 40% of Romanian respondents. The results reveal that European organizations are a little more aware of the importance of a existent code of ethics. Thus, an ethics code plays an important role in creating an organizational climate based on ethical values, being a reference framework for decision-making in this area. At the same time, the existence and application of the code of ethics in an organization contributes to the image and trust that stakeholders have in the organization.

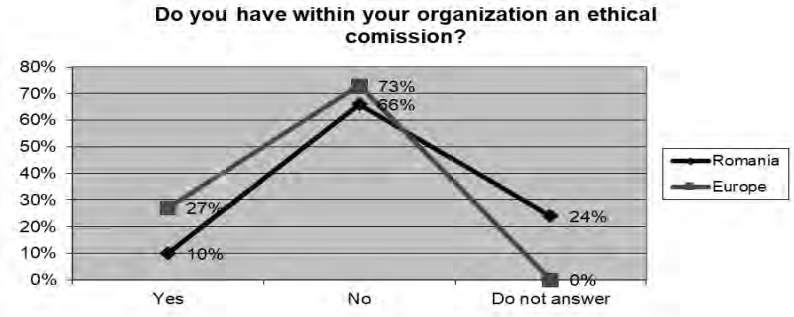

Fig. 3. Comparative analysis regarding the existence of ethics committee within the investigated Romanian and European organizations

27% of the investigated European subjects state that there is an ethics committee in their organizations, while in Romania only 10% of respondents say this. A fairly high percentage of Romanian respondents (24%), which do not respond to this question, can be noticed.

Regarding the main activities carried out by the ethics committee, the answers were similar in the two researches carried out in the 331 Romanian organizations and in the 74 European organizations. Thus, the main activities of the ethics committee are:

- makes recommendations for solving and/or enforcing sanctions;
- sets out the specific procedures to follow in the event of inappropriate conduct;
- seeks to enforce and comply with legal provisions on moral and professional conduct;
- formulates opinions and recommendations related to ethical issues raised within the organization;
- organizes training on ethics;
- performs staff evaluations on ethics;
- promotes equality and diversity policy;
- initiates informative meetings on this issue;
- develops informative materials in the field of ethics.

Subsequently, the investigated subjects were asked to propose, if necessary, ethical changes in the organizations they are part of. Here are the answers in descending order of their occurrence:

- respecting ethical values within the organization;
- the inclusion of ethical values in organizational culture;
- employee involvement in the decision-making process;
- improving communication in the organization;
- developing a code of ethics;
- applying ethics;
- promotion on performance criteria;
- conducting ethical audits;
- organizing training on business ethics;
- assuming individual responsibility;
- changing the managerial style in the organization;
- cooperation with other countries, other values, not just western European ones;
- observance of the work schedule;
- performing internal staff assessments.

Subjects investigated in Romania have more emphasized the need to develop a code of ethics and the compliance with it, as well as the inclusion of ethical principles and values in organizational culture, whereas the investigated subjects in the European organizations have specified the need to respect the work program or to open up their organizations to other cultures, other countries.

Asked about the employees' likely responses to these changes, most of the investigated Romanian subjects responded that the employees would probably be disinterested, reluctant to these changes, while the investigated subjects from the European organizations stated that the reactions would be positive.

Probably these responses are primarily determined by a higher resistance to change of subjects investigated in the Romanian research, with the subjects in Europe having a higher degree of adaptability. This is also demonstrated by respondents' answers to the importance of certain factors on the future performance of the organization (presented above), where an average of 4.21 for respondents in Europe and only 3.65 for those in Romania was obtained for adaptation to change. Thus, it can be concluded that Romanian organizations must be more willing to make changes and to adapt to them in order to have performances in the future, in the conditions of globalization.

Discussion and conclusions

A conclusion of the two quantitative researches, representative only in the two samples investigated, is that ethics is beginning to play an increasingly important role in Romanian affairs (or at least declaratively it must play an increasingly important role).

Unfortunately, the investigated Romanian organizations do not yet have ethical codes in a satisfactory percentage, with no ethical representatives. Without having implemented the basis for creating an ethical climate it's not surprisingly that employees have a higher resistance to change or the unwillingness to embrace improvements that would lead to development.

The European organizations investigated are one step ahead of those in Romania, but there are still many gaps here, many changes that need to be made so that these organizations become conformed to the 21st century requirements.

References

Bacali, L. et al.
2002
Marketing. Manual de inginerie economică, Cluj-Napoca, Ed. Dacia.
Blaga, B.L.
2011
"Cercetări privind rolul eticii în afaceri în condiţiile globalizării", PhD thesis, UTCN
Brimmer, S.
"The Role of Ethics in the XXIst Century Organizations.", Leadership Advance Online, Issue XI, http://www.regent.edu/acad/global/publications/lao/issue_11/pdf/brimmer.pdf, accessed March the 23rd, 2018
Cordoş, R.C., Blaga, B.L.,
2016
"Research regarding ethics in European organizations in a time of crisis", Proceedings of the 5th Review of Management and Economic Engineering International Management Conference – From Management of Crisis to Management in a Time of Crisis, September the 22nd-24th 2016, 313 – 318
Cordoş, R.C., Blaga, B.L.,
2017 a
"Researches regarding the factors that influence the organizations' performances from the perspective of business ethics, Review of Management and Economic Engineering, volume 16, nr.4(66), 2017, ISSN 1583-624X, 627-633
Cordoş, R.C., Blaga, B.L.,
2017 b
Comparative analyses regarding business ethics in Romanian and European organizations, Review of Management and Economic Engineering, volume 16, nr.3(65), 2017, ISSN 1583-624X, 451-458
Fullerton, S., K. B. Kerch and H. R. Dodge
1996
"Consumer Ethics: An Assessment of Individual Behavior in the Marketplace", Journal of Business Ethics 15(7): 805–814
Kidder, R.M.
2001
"Ethics is not optional", Association Management, 53(13): 30-32.
Tsalikis, J. and B. Seaton
2006
„Business Ethics Index: Measuring Consumer Sentiments Toward Business Ethical Practices", Journal of Business Ethics 64: 318

BEHIND MAKING DECISIONS: AN OVERVIEW REGARDING ROMANIAN MANAGERS

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Abstract

Purpose *– the article aims to realize a realistic radiography of the main characteristics concerning the Romanian managers in the free market economy, characterized by a very strong competition both in terms of profitability and in terms of quality.*

Methodology/approach *- the data sources used in the study are numerous: papers, documents, statistics, press releases of the Romanian managers and information obtained directly from the Romanian companies (via a questionnaire). These data have been analyzed and interpreted by the authors.*

Findings *– The study shows that there is still a difference between the management of local companies and the one practiced in multinational companies operating in Romania but, in the last period, Romanian managers have become more and more efficient because they have understood the need to change their mentality and management style.*

Research limitations/implications *– the limits of this research are given by the representativeness of the analyzed sample and by the subjectivity of the respondents.*

Practical implications *– the practical implications of this study are related to highlight the need to change Romanian managers' mentality and the need to improve the manner in which business must be done, in order to increase the competitiveness of Romanian companies.*

Originality/value *– the main contributions (aspects of originality) of this article are: first, the attempt to sketch a current profile of the Romanian manager and the second, to present some trends in the local management.*

Key words: *Romanian managers, leadership style, aggressive/defensive management.*

Introduction

The 1989 Romanian Revolution brought, besides the much-anticipated freedom and democracy of the Romanians, a great challenge for Romanian management and, implicitly, for the Romanian managers who have to adapt to the new demands imposed by the free market economy. If in the communist period, the Romanian managers carried out their activity strictly following the provisions of the unique national plan, the free market economy imposed, in order to be efficient, to the local managers an almost complete change of their approach to the economic and managerial issues (Simionescu and Drob, 2001b). This change could not have happened overnight, but over several years. The lack of an adequate managerial training and of a clear strategy, conservatism, certain personal or group interests were the main obstacles faced by most Romanian managers. In addition to these obstacles, Romanian managers faced an avalanche of restructuring and privatizations that affected the structure of the national economy and domestic enterprises. In this context, those managers who have adapted at the new conditions, have learned from their mistakes and from their successes or from other managers, succeeded that tumultuous context. In the post-revolution public space, there have been different typologies of leaders, a fact which reveals that collective representations are associated to the leader's image and these changes determine also a new imagologic profile for managers (Cîrtiţă-Buzoianu, 2015).

The process of changing mentalities, of how a profitable business has to be done, is not over. The road to performance is long and tedious, but the positive examples of the local business environment, given by the Romanian managers who have performed and developed successful business models, give us the hope that the Romanian management and, implicitly, the Romanian managers can cope to the harsh competition in the free market.

Main studies on Romanian managers after 1989

After 1989, with the change of the totalitarian regime into a democratic one, Romania has undergone a series of structure and mentality transformations. The transition to the market economy also required changing the way to think and doing business. This change did not happen overnight, but over time, the process continues even now. Studies of Romanian managers have surprised, at some point, a certain stage of this transformation of the mentality and leadership style of local managers. The current portrait of the Romanian manager must be seen in the light of the transformations that have taken place into the Romanian society and economy.

In 1997, Prodan, A. (1999) conducted an experimental research based on questionnaires on motivation and attitude in Romanian companies' management. This research, carried out during the whole year 1997, had been totalized 123 respondent managers from 10 counties of Romania. In the outlining of the attitude profile, three important aspects were taken into account: tasks structuring, decision making and attitudes against employees. Regarding the tasks structuring, the study shows that most of the Romanian respondents' managers (66% from the total number of interviewed managers) relied only on a small extent on planning but rather on clear regulations. In terms of decision making, most questioned managers said that they want to consult employees and consider their views, but in reality some of them preferred to make decisions without giving too much explanation to subordinates. As regards the attitude against the subordinates, it was rather the acceptance of McGregor's X theory, which considers, among other things that employees do not work out of pleasure, in order to achieve organizational goals, so they must be penalized and subjected to a constant control (Prodan, 1999).

A study realized by two British economists (Edwards and Lawrence, 2000), entitled "Management in Eastern Europe," reveals that Romanian managers have an authoritarian and despotic management style. At the same time, local managers claim employees' loyalty.

Result Development consultancy and training company conducted a study entitled "Profile of the Romanian manager" between 2009-2011, on a sample of 110 Romanian national companies managers, (35.5% from the total number of respondent managers) and from multinationals companies (64.5% from the total number of interviewed managers).To the question "What are the higher managerial expectations from your heads?", most respondents said that they expected communication, cooperation, integrity, fairness and sincerity (Nicolae, 2011). To the question "What are the managerial expectations from the subordinates?", most respondents said that they expect them to work together, to communicate and to prove integrity and fairness (Nicolae, 2011). The main conclusions of this study highlighted that the Romanian manager is usually a middle-aged man who works between 45 and 50 hours a week, his work being mainly focused on solving the operative problems. The Romanian manager is perceived as an authoritarian person (especially those who work in national companies) who exercise excessive control, low leadership and who fails to properly motivate their subordinates. Regarding the difference between the Romanian managers from national companies and the Romanian managers from multinational companies, the study shows that the Romanian managers working in national companies are more interested by the present, short-term results and to solve current problems, relying mainly on intuition and experience, while the Romanian managers working in multinational companies have a broader vision, aiming at a longer time horizon, relying on scientific management methods and techniques. There is also a difference between Romanian managers in national/multinational companies regarding to how they see themselves compared to how they act in reality. Thus, Romanian managers in national companies tend to describe themselves in a much more favorable position as they really are, while Romanian managers in multinational companies describe theirs profile in a more realistic manner.

Another interesting study is the National Research one, on Culture Organizations, which was conducted in 2012 by Human Synergistic Romania (Stan, 2014). This study, based on a questionnaire

(Organizational Culture InventoryTM), focused on over 150 Romanian companies. This questionnaire tries to find answers to two fundamental questions: "How do things happen in this organization?", "How would it be ideal to happen in this organization?" Among the findings of this study it is noted that currently, in Romania, the management styles used are predominantly aggressive and competitive ones, type-certificated as aggressive/defensive type. This style manifests itself by the tendency to establish its own company value through competition and comparison with others, with aggressiveness tendency; that means irresponsible attitude and unnecessary risk taking. Regarding the ideal management style that the employees would like to implement within local organizations, the Romanian ones would prefer a constructive management style, manifested through the need for social interaction and interpersonal contact (Stan, 2014).

A recent survey (Eurostat, 2017), conducted in 2014 and published by Eurostat in 2017, reveals that the proportion of female managers in Romania is 41%, well above the EU average (35%). At the same time, this study shows that male managers earn about 5% more than female managers (on the same position and at the same level of work), a much lower mismatch than the EU average (23.4%).

Own study on the management style engaged by Romanian managers in Bacau County, Romania

The study carried out by the authors of this article aims to verify if the management style practiced in Bacau, Romania is circumscribed to the profile of the Romanian manager, realized by other studies on the Romanian manager, carried out at regional or national level. Bacău County is located in the Eastern part of Romania and, along with other 5 counties, is part of the N-E development region, occupying the second place in this region in terms of its contribution to the national GDP. Romania's N-E region is considered to be the least developed region of Romania. In addition, this region attracts the lowest direct investment from all the development regions of Romania (Drob and Zichil, 2013).

This study is based on a questionnaire consisting of two sets of statements. The first set of 18 items is actually a Leadership Styles Questionnaire. Each item has a score assigned according to the respondent consent or disagrees with the statement of the item (1 - Strongly Disagree; 2 - Disagree; 3 - Neutral; 4 - Agree; 5 - Strongly Agree). Depending on the score obtained, the management style qualifies into three major types: authoritarian, democratic or laissez-faire. The second set of statements (4 items) intend to measure managers' attitudes against subordinates (McGregor's X or Y theory acceptance). As well as into the first set of statements, each item has a score assigned, according to the level that the respondent agrees or disagrees with the statement of the item (1 - Strongly Disagree; 2 - Disagree; 3 - Neutral; 4 - Agree 5 - Strongly Agree). Depending on the score obtained, managers' attitudes against subordinates may be: to accept the X theory (high score) or to accept McGregor's Y theory (small score). In this study, 40 managers were interviewed on different hierarchical levels in companies and public institutions in the county of Bacău.

The first set of 18 items (the Leadership Styles Questionnaire) highlighted that most of the Romanian managers working at Bacău County uses, at least at declarative level, a leadership style that is overriding democratic with overbearing specific management influences. Most of the respondents to this first set of statements were in agreement or in total agreement with the following statements: "Employees want to be a part of the decision-making process"; "Providing guidance without pressure is the key for a good leader being "; "Most workers want frequent and supportive communication from their leaders"; "Leaders has to help subordinates to accept responsibilities for completing their work". The agreement with these statements highlights the democratic character of the management style. On the other hand, the influence of the authoritarian management style was highlighted by the total or partial agreement of the respondents regarding the statements: "Effective leaders give orders and clarify procedures"; "The leader is the chief that judge the achievements of the members of a group".

The second set of 4 items (measuring the McGregor's X or Y theory acceptance) revealed that most of the Romanian managers operating in Bacău County (35 managers from 40 questioned) choose rather to accept McGregor's Y theory, which considers, among other things, that employees work with pleasure and but they need security, having also other needs, such as self-updating or deference. Thus, most of the respondents to this second set of statements disagreed with the following statements: "Most employees cannot be trusted"; "Most people are lazy and do not want to work"; "Most employees have little ambition." At the same time, many respondents to this second set of

assertions agreed with the following statement: "Most employees will not exercise self-control and self-motivation - managers must do this for them" (the agreement with this statement indicates a certain inclination towards a partial acceptance of the X theory).

Conclusions

Taking into account the results of the studies conducted so far in relation to the Romanian managers it is possible to draw, with a rewarding approximation, the current portrait of the Romanian manager. Most of the cases, is a man (even if in the last period the number of female managers has grown considerably), of average age, which has increasingly warded of the authoritarian management style (especially those in multinational companies), which is trying to adopt a much more democratic management style. As a general rule, Romanian managers in national companies tend to describe themselves in a much more favorable position than they really are, against theirs homologues from multinational companies that describes them in a more realistic manner. Recently, a certain disclaim of the McGregor's X theory in favor of the Y-theory has been observed. Thus, Romanian managers (especially those in multinational companies) give more credit to the employees they are guiding, using appropriate methods of motivation, in order to achieve organizational goals.

If we analyze the Romanian managers' performances, it is possible to conclude that they have become more and more competitive and performing (especially those from private companies who are facing an acerbic competition). This is highlighted, on one side, by the fact that, in recent years, the profitability of domestic companies is on an ascending trend (96 billion lei in 2016, compared to 89 billion in 2015 and 83 billion lei in 2014). Besides, we must note the growing presence of domestic companies in the top of most profitable companies operating in Romania (Banca Transilvania leading this top in 2016). Another important aspect that anticipates the tomorrow Romanian manager's portrait is the fact that many native managers have understood the need to change the mentality and the way of doing business. Moreover, many of them have implemented or have begun implementing these changes. Many companies have understood that, in order to perform, it is necessary to invest in the human resources. The more these investments will grow, the more companies will be able to resist and grow on the market.

References

Cirtita-Buzoianu, C.
2015
"A Leader's Image and Representation in the Romanian Public Space" In INTERSTUDIA, University of Bacau, 18: 146-154.
Drob, C.
2016
"Particular aspects regarding entrepreneur and entrepreneurial culture" In Studies and scientific researches, Economics edition, Faculty of Economic Sciences, "Vasile Alecsandri" University of Bacau, 23: 65-70.
Drob, C. and Zichil, V.
2013
"Recent aspects concerning SMEs From North-East region of Romania" In Journal of Engineering Studies and Research, "Vasile Alecsandri" University of Bacau, 19 (4): 7-11.
Edwards, V. and Lawrence, P.
2000
"Management in Eastern Europe", New York, Palgrave Macmillan.
Eurostat
2017
"Only 1 manager out of 3 in the EU is a woman … earning on average almost a quarter less than a man" In Newsrelease: 38, Eurostat Press Office.
McGregor, D. and Cutcher-Gershenfeld, J.
2006
The human side of enterprise, McGraw-Hill Professional

Nicolae, M.
2011
"The portrait of the boss in Romania" https://www.cariereonline.ro/inovatie/studii-analize/portretul-sefului-din-romania
Prodan, A.
1999
"Managementul de succes. Motivație și comportament" Polirom Publishing house, Iași.
Simionescu, G. and Drob, C.
2001a
"Present evolution of firm organization and management" In Proceedings of 2nd International Conference on the Management of Technological Change, Technical University “Gh. Asachi” of Iaşi : 107-112.
Simionescu, G. and Drob, C.
2001b
"O viziune de ansamblu asupra managerului român în perioada de tranziţie spre economia de piaţă" In Studies and scientific researches, Economics edition, Faculty of Economic Sciences, “Vasile Alecsandri“ University of Bacau, 5: 102-106.

OCCUPATIONAL HEALTH AND SAFETY RISK MANAGEMENT

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Abstract

Purpose *– The purpose of this paper is to present an outline of Occupational Risk Management in Occupational Safety and Health in Romania. The paper aims to presents some legals tools to manage the risk during the production process, with the ultimate goal of obtaining managerial performance and zero risk for workers.*

Methodology/approach *– From occupational health and safety point of view, the term "risk" can be defined as the most probable consequence of a hazard, combined with the risk or occurrence probability. As such, the risk is a function of danger and exposure. To manage the professional injury and illness risks and to apply health and safety legal provisions, the practice of the organizations led to the development of the documents that met the Romanian and EU legal requirements.*

Findings *– In Romania, the legislation governing the occupational health and safety area is based on the provisions of Law 319/14.07.2006 published in Official Monitor no. 646, July 26th, 2006. The Law 319/2006 puts into operation the requirements of the Framework Directive 89/391 for occupational health and safety.*

Research limitations/implications *– Professional risks must be identified, quantified, ranked and evaluated such that, the elaborated measures will eliminate or decrease the risks from the source. This control process of occupational health and safety risks of injury or illness uses documents which are applicable to any organization. These documents are legally required in each state, being instruments of the organization management, working like a system along with all other documents.*

Practical implications *– Occupational risk management can be realized on every phase of investment, starting with designing of the work process, choosing the materials and working methods. This risk management has as a unique goal the mitigation to zero of the injury or illness risks. To deeply analyze occupational risks, good practice, together with current legal requirements focus on the four elements of the work system: executor, work task, work means and equipment and work environment by jobs. The analysis of occupational risks of injury or illness contains evaluation methods, which are using statistical, mathematical, graphical and scalar methods. Thus, managerial decisions can be oriented more towards one or more elements of the work system and can keep an equilibrum with the desired profit.*

Originality/value *– Occupational Health and Safety System Documents have the role of minimizing professional risks and helping organization's management to obtaining managerial performance and zero risk for workers.*

Key words: *risks, occupational halth and safety, management.*

Introduction

The ongoing industrial revolution also includes the health and safety domain, which assists this development process. The participants and beneficiaries of this revolution don't have to endure a lowering of the protection levels from the beginning of it. Consequently, the health and safety domain needs to play its role in this historical stage. The risks of injury and illness are managed from the beginning, when the technological processes are being developed, on each production stage, until the end of every technological process.

Background

Risk or occupational injury management is required in all phases of economic processes. This process of controlling occupational hazards also influences the economic side, because often avoiding occupational hazards generates significant costs. Authors C.A. Williams, M. L. Smith and P. C. Young (2003) propose a model of organizational structure that includes risk management, which they called the model of strategic, operational and risk management. In the view of the three authors, these three are the central functions of any organization. The model can be seen in Figure 1. According to this theory, the risks (of all kinds) are part of the management of the organization and can not be ignored in managerial decisions. There is also a risk of injury or professional illness, which may influence managers' decisions on the conduct of activities, between the risks involved in administration of the organization.

Figure 1. The model of strategic, operational and risk management
(by C.A. Williams, M. L. Smith and P. C. Young (2003)) [24]

As a consequence, the presence of risks of occupational injury and illness, from the health and safety at work point of view, must be studied so that the management team receives the best information on the influence of these risks on the elements of the work system like is mentioned in G.D 1425/2006 art.15(1)1. Thus, the knowledge and management of professional risks is done in order to diminish them at all stages of the organization's operation: at the time of designing the technological processes, at the time of purchasing the equipment, at the moment of upgrade or conversion of the equipment. We have also seen moments in which there have been radical changes in production processes, as specific legislation has become very severe in terms of safety and health at work. There have been situations in which industries have been abandoned due to the severe measures imposed in those sectors, and thus costs for avoiding occupational risks far outweigh the benefits. Asbestos industry may be considered an example. Another example is the exploitation and treatment of cyanide ores. To these are added painting processes using paints and materials based on alkyd resins or diluents, etc.

Methodology and approach

The free encyclopedia Wikipedia/etimologie (visited in 02.07.2018) refers to the word "risicu" beginning in Homer's (11th century) when it was used as a description of the threats faced by the characters. Later, the term commercial risk is found in Italy, after which the word "risk" appears in the maritime vocabulary (17th century). The Oxford English Dictionary (visited in 02.07.2018) cites the oldest source of the word "risque" in 1621. Thus, this dictionary refers to risk, as well as an uncertain event that leads to losses. The risk is used in many areas, ranging from commercial, financial, medical, insurance, environmental, information, business, and health and safety. To decide the importance of the risk of injury and professional illness, the quantitative analysis was carried out. In statistics, the risk is a relation between the probability of occurrence and the expected loss in case of the occurrence, following the relation:

$$R = \sum_{\text{All the cases}} (\text{occurence probability}) \times (\text{expected loss in case of happening})$$

Knowing the risks of injury or occupational illness in a quantitative form helps managers to decide on their importance to the health of workers and on the costs of canceling or mitigating these occupational hazards. Management of occupational accident risks or professional illness is done in practice with a system of documents elaborated at the level of each organization, in compliance with the current legal provisions.

Results

In today's Romania, the field of health and safety at work is managed by Law 319/2006, which was published in the Official Monitor no. 646 of 26 July 2006, implementing the requirements of Framework Directive 89/391 on health and safety at work. These legal provisions, together with the methods leading to the quantitative knowledge of professional risks, have as their sole purpose the reduction to zero of professional risks of illness or injury.

The approach taken by this legislation is very different from the former labor law legislation, adopted in 1996, which provided technical republican rules for all professions in the occupation code in Romania. Why is the current legislation very different? Because it requires employers to be in possession of a set of job-specific documents. These documents are designed by specialists in the field of health and safety at work, are assumed by the employer and are specific to a particular workplace. This application is specific to each job.

In concrete terms, the current legislation requires the employer to have a set of specific workplace documents from the point of view of safety and health at work. These documents begin with the authorization procedure for any activity. This can be done for companies with the help of Law 359/2004 which simplifies these authorization procedures. The specific documents concerning safety and health at work is based on identifying factors of injury or occupational illness which are made from the design phase of the production process/activity and helps realising the professional illness or injury risk assessment study. Risk assessment work serves as quantifying them and take into account the four elements of the work system (G.D. 1425/2006 Art.15 (1)): executor, means of production, production environment and the workload on workstations, considering the presence at work of the specific groups. The evaluation methods are chosen by the experts who have the task to evaluate them and these methods are based on mathematical methods, graphs, domain scales, based on the history of events and accidents in the analyzed field.

The goal is to provide management with concrete information on the risks of injury or occupational disease in order to be able to take measures to reduce or eliminate them. Professional risks are identified and evaluated from the conception and design phase of the processes, and these evaluations must keep up with the reality on the ground, whenever changes occur in processes, equipment or materials included in the work process. The measures necessary to eliminate or mitigate occupational hazards are gathered in the Prevention and Protection Plan from the point of view of safety and health at work, which accumulate the technical, organizational, hygienic-sanitary or other measures (G.D. 1425/2006, Section 7). In order to implement these measures, the current legislation requires the employer to be in possession of a set of instructions that are specific to safety and health at work, completing the legal provisions in the field and should take into account the particularities of the activities in the unit (G.D.1425/2006. Art. 15 (1)3). These own working instructions are cumulative in the training subjects (G.D. 1425/2006. Art.15(1)7) and after the training for the workers, these working instructions are recorded in the individual training sheets in the field of occupational safety and health (G.D. 1425/2006. Annex 11) or in the collective instructional verbal processes (G.D. 1425/2006. Annex.12) that have the role of harmonize workers' actions. Also, for the implementation of the measures foreseen in the Prevention and Protection Plan, Signaling Plans (G.D.971/2006, Art.1,5) are developed, which include pictograms (interdiction, warning, obligation, first aid and emergency response), acoustic signaling, lightning, floor markers, pressure containers, pipes and pipelines, code words and finally signal gestures. Other documents present in the field of occupational safety and health are those related to the equipment of the workers (G.D 1.048/2006), the health check, the records concerning the jobs requiring additional medical examinations, special qualifications, the technical supervision of the work equipment, the record of the places with serious or imminent danger, of those entering the ISCIR regime, technical books of machinery and equipment, and repair/maintenance schedules of work equipment. Occupational risk management also includes documents relating to the protection of pregnant women at work (G.E.O. 96/2000), the organization of workplaces during extreme weather seasons (G.E.O. 99/2000), the organization of mobile and

temporary construction sites (G.D. 300/2006), the use of chemical (G.D.1.408/2006), explosive (G.D. 1.058/2006), biological (G.D.1.092/2006), mutagenic and carcinogenic (G.D.1.093/2006) substances.

Conclusion

Occupational Health and Safety System Documents have the role of minimizing professional risks and helping organization's management in making decisions that lead to profit. The documents of the occupational safety and health system also work systemically, they are integrated into the cumulative documents that manage the organization, taking into account the legal requirements in the field of health and safety at work.

References

EU-OSHA
1989
Framework Directive 89/391/1989 „Framework Directive on the implementation of measures to promote and improve the safety and health of workers at work". EU-OSHA. Official Journal of the European Union, EEC of 12.06.1989, Chapter 05, Volume 002, p.88-96, Special edition in Romanian, Bruxelles, Bg.

The Government of Romania
2006
G.D. 300/2006 „Government decision on minimum safety and health requirements for temporary or mobile construction sites." Official Monitor no. 252/21.03.2006, Bucharest, Ro.

The Government of Romania
2006
G.D. 971/2006 „Government Decision regarding minimum requirements for safety and / or health signaling at the workplace". Official Monitor no.683/09.08.2006. Bucharest, Ro.

The Government of Romania
2006
G.D. 1.048/2006 „Government Decision on the minimum safety and health requirements for the use by workers of personal protective equipment at work". Official Monitor no.09.08.2006. Bucharest, Ro.

The Government of Romania
2006
G.D. 1.058/2006 „Government Decision on minimum requirements for improving the safety and health protection of workers as they may be exposed to a potential hazard due to explosive atmospheres". Official Monitor nr.737/29.08.2006, Bucharest, Ro.

The Government of Romania
2006
G.D. 1.092/2006 „Government Decision on the protection of workers from the risks related to exposure to biological agents at work". Official Monitor no. 762/07.09.2006, Bucharest, Ro.

The Government of Romania
2006
G.D. 1.093/2006 „Government Decision laying down minimum safety and health requirements for the protection of workers from the risks related to exposure to carcinogens or mutagens at work". Official Monitor no. 757/06.09.2006, Bucharest,Ro.

The Government of Romania
2008
G.D. 1.048/2006 „Government Decision on Classification, Packaging and Labeling of Hazardous Substances". Official Monitor no.722/23.08.2006, Bucharest, Ro.

The Government of Romania
2006
G.D.1425/2006 „Government Decision with subsequent amendments and completions. Methodological Norm for the Application of Law 319 / 2006". Official Monitor no.882/30.10.2006. Bucharest, Ro.

The Government of Romania
2003
G.E.O.96/2003 „Government Emergency Ordinance on the protection of maternity at workplaces". Official Monitor no. 750/27.10.2003. Part I., Bucharest, Ro.

The Government of Romania
2000
G.E.O.99/2000 „Government Emergency Ordinance on measures that can be applied during periods of extreme temperatures for the protection of persons employed". Official Monitor no.304/04.07.2000. Part I., Bucharest, Ro.
The Government of Romania
2004
Law No.359/2004 „Law on the simplification of the formalities for the registration in the trade register of natural persons, family associations and legal persons, their tax registration, as well as the authorization of the operation of legal entities, as subsequently amended and supplemented". Official Monitor no. 839/13.09.2004, Bucharest, Ro.
Oxford English Dictionary
2018
https://en.wikipedia.org/wiki/Oxford_English_Dictionary. Visited on 02.07.2018
Tofan, I., Gontineac, M. And Rusu
2011
„Theory of Risks and Applications"- Periodical Information no.1 / 2011-pag.4, Alexandru Myller Publishing House, Iasi, 2011
http://www.math.uaic.ro/~cefair/files/nr_1_2011_revista.pdf (visited on 07.07.2018/17: 33)
WIKIPEDIA
2018
https://ro.wikipedia.org/wiki/Risc#Etimologie, https://ro.wikipedia.org/wiki/Risc#cite_note-2. Visited on 02.07.2018.

THE METHODOLOGY OF THE PERFORMANCE MEASUREMENT BASED ON THE ANALYSIS OF PROCESSES IN HIGHER EDUCATION

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Abstract

Purpose *– This paper presents the development of a framework of measuring the performance in Romanian higher education institutions, following a process-based approach.*

Methodology/approach *– The methodology proposed in this paper is based on two analysis methods. The AHP and QFD methods are applied and their results contributes to the performance measurement in higher education.*

Findings *– Based on the measurements of processes undertaken by the authors, a methodology - applied on a department level in a university - was established for the contribution to the implementation of performance management.*

Research limitations/implications *– The paper provides some concrete solutions obtained at a department level. These solutions based on new approach for performance measures are in keeping with the strategy of the university.*

Practical implications *– The practical aspects addressed by the authors are linked to the identification of the most problematic obstacles encountered in the implementation of performance management using a new methodology based on the process approach.*

Originality/value *– The methodology based on the process-oriented approach in universities could be implemented for measuring, evaluating and improving such services as the educational delivery, quality research and professional services.*

Key words: *performance management, process approach, KPIs, methodology.*

Introduction

The importance of performance management has long been recognized by academics and practitioners from a variety of functional disciplines. Performance measurement can be defined as the process of quantifying the efficiency and effectiveness of action and it can be relating to quality, time, cost and flexibility (Neely, Gregory, & Platts, 2005).

A popular approach for performance measures is quality function deployment (QFD) which can be applied for process and design improvement (Aytac & Deniz, 2005). Similarly, other studies measure quality by adapting five-dimension (tangibles, reliability, responsiveness, assurance and empathy) SERVQUAL model (Parasuraman, Zeithaml, & Berry, 1988).

Kaplan and Norton (2005) introduced the concept of the balanced scorecard that measures business unit performance by four perspectives – financial, customer, internal business processes and learning and growth.

The performance measurement in higher education is a part of a management strategy that helps managers in making good decisions and thinking seriously about the managerial purposes to which performance measurement might contribute and how they might deploy these measure. Performance

measures are of a wide variety and they are used to evaluate, control, budget, motivate, promote, celebrate, learn and improve (Behn, 2003).

Research problem

The aim of this paper is to develop a framework of the performance in Romanian higher education institutions, based on the process approach. A process-oriented organization departs from fragmented management of function towards coordination and integration of the existing flows into a single coherent system capable of responding to the needs of the environment (McCormack and Johnson, 2001).

There are different models for measurement of the performance in universities. A model is proposed to identify the degree of maturity in performance management in New Zealand's universities. A survey consisting of Likert-scale items derived from the maturity model was then administered to academic and administrative staff at eight universities. The synthetic model consists of seven elements, organised into three groups:

a) group one –use and effects with two elements: usage of performance information in decision-making and strategic alignment and prioritisation;
b) group two – key design elements with three elements: outcomes framework, variety, comprehensiveness, and quality of measures and depth and insight of commentary;
c) group three – key shapers with two elements: internal ownership of performance framework and accurate and timely underlying data.

The results indicate that the eight universities utilise performance measurement fairly frequently, with general support, and to benefit of the institutions and most of the differences between academic and administrative staff related to support for, rather than use of, performance measurement (Zhival, 2017).

Other performance models for higher education institutions are categorized based on various criteria including evaluation procedures and designs, evaluation evaluators and evaluation objectives. An example of a standard evaluation model is quantitative student opinion surveys that are used in a number of countries including USA, UK and Australia (Darwin, 2012). Students-based evaluation is considered superficial and incomplete for enhancing academic quality of higher education institutions and addressing needs of increasingly diverse population of learners (Darwin, 2012).

There are other categories for evaluation such as management-oriented, outcome-oriented and process-oriented evaluations. The outcome-oriented is appropriate for organizations that are interested in the results. The management-oriented approach is the context, input, process, product (CIPP) model that it is a model used in public schools and higher education institutions in USA and across the globe. CIPP includes context stage where evaluators identify environmental readiness and community needs, input suggests a project that address the needs identified in the context stage, process control and assess the project process, and product stage measures and judge project outcomes, worth and significance. The goal of CIPP is "to improve" not "to prove" (Stufflebeam & Shinkfield, 2007).

Research Methodology

This paper describes a new framework for performance management in Romanian higher education institutions, based on a new approach. The proposed methodology is based on the following principle: "there is no best performance, but there are always better performances to achieve" (Badawy, 2016) and consists of ten steps.

The first step in this research is identifying and analysing the vision, the mission and the strategic directions which a university plans to achieve on short and long term. Another aspect that should be known is about the major projects that are running/are underway in the university at the moment of the analysis. This analysis is important to understand which are all stakeholders and their requirements.

The second step is formulating the set of requirements that the structure or department of the university (for which the performance is be evaluated) should respond to. Requirements will be

considered from relevant stakeholders such as teachers, researches, board of directors and other departments within the university.

The analytical hierarchical process (AHP) is used to rank the requirements and after that, the next step in this research is identifying the processes within the analyzed department, which will be defined taking into account the important requirements obtained from the AHP analysis.

After identifying the processes, a link matrix between the requirements of the AHP analysis (on the lines) and the processes (on the columns) will be completed. Next, the links between them will be analyzed and if there is at least one strong connection, we will proceed to the next step.

The KPIs on each process resulting from the analysis need to be established. KPIs act as a set of measures focusing on those sides of the organizational performance that are critical for the performance of the organization (Badawy, 2016). The analysis is carried out by means of the QFD method, which shows the requirements on the rows and the set of KPIs on the columns. This analysis shows/ indicates an important level for each KPI and whether there is a strong link on each row/column. If strong links exist it means that KPIs are well defined. If not, we must define other KPIs until we have at least one strong link on each row/column.

The next step should be drawing the list of KPIs, which measure the current performance of the processes within the analyzed department. This approach gives us details about the analysis of the current level of performance in that particular department. Depending on the importance of each KPI and the approach by which performance is measured in the department, the next step consists in setting target values on each KPI. This also depends on the desired level of performance in order to meet the requirements of the university.

Finally (the last step), certain projects will be proposed to achieve the target values within a realistic term. The criteria for prioritizing the most important projects will also be defined. For instance, some of these criteria might be: implementation time, real costs, difficulty of implementation and completion, etc. After defining the criteria, the projects will be classified and will be implemented in order of priority.

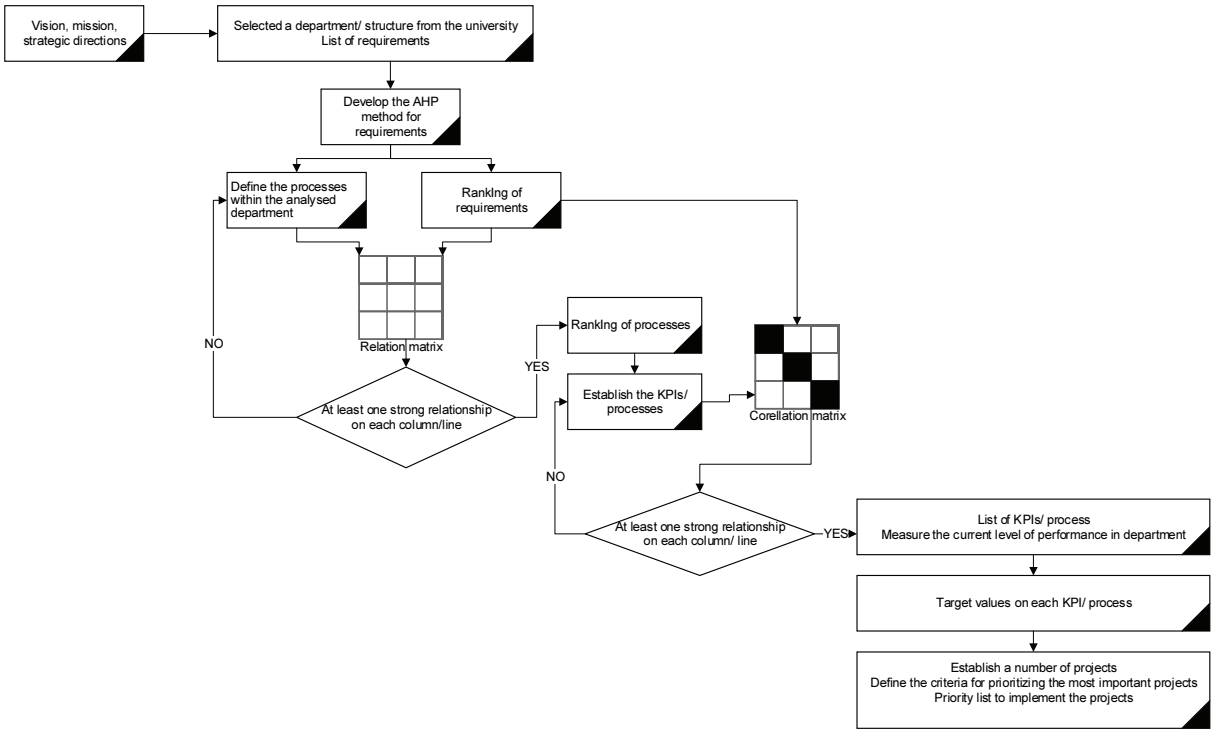

Figure 1. The methodology proposed by authors

An illustrative application of the methodology to a department

Based on the measurements of performance undertaken by the authors, a methodology - applied on a department level in a university - was established for the contribution to the implementation of performance management.

The first step was identification the mission and the vision of the Technical University of Cluj Napoca (TUCN). The mission is conducted in the following directions: human resources education; relevant knowledge generated through research, innovation; connecting the academic community to the European and global one. The proposed vision reflects the Technical University's commitment to follow the educational trends that lead to excellence in scientific research. In addition, this view reflects maturity, institutional strength and stability which the university upholds (UTCN, 2018).

The next step was, firstly, to select a department of the university to be analysed in our study and secondly, to identify the research objectives and strategy for 2016-2020. The Department for Research, Development and Innovation Management is a department of TUCN and its main directions/lines of intervention and strategy for 2016-2020 are as follows: increasing the autonomy and furthering research capacity; setting up and upgrading high-impact research laboratories; recruiting, developing and retaining the highly skilled human resources; supporting high performance in scientific research; supporting the organization of high visibility international conferences; supporting technological transfer to market.

Furthermore, we have identified a list of requirements from different categories of stakeholders, such as: teaching staff / researchers, board of directors, department directors, deans, members of the maintenance and administration department, administration board/ council, members of the financial and accounting department, and Agency for Quality Assurance in Higher Education (ARACIS).

The requirements that the department chosen for our study should meet are as follows:

- provide the software tools to manage the department data;
- provide the online access to data from the finance department;
- provide the software tools to manage research projects;
- provide the software tools to allow reporting of scientific indicators;
- provide the software tools to obtain formal approvals for project activities in electronic form;
- provide the software tools to generate reports on scientific indicators;
- provide the software tools to estimate cash flow for research projects underway;
- generate reports on scientific indicators (for the university and faculties).

The AHP method was used for ranking the aforementioned requirements. The results of our analysis are shown in Figure 2. The foremost requirement, as it resulted from this analysis, is to provide software tools for managing research projects.

Importances / Sorted ITEMS 1	Calculated Importance %	Final Importance %	Gewichtung, Sorted Items (Final Importance %)
3 provide software tool to (financially) manage research projects (by project directors)	32,6%	27,1%	
2 provide online access to data from the financial department (for own staff)	22,2%	19,6%	
5 provide software tool to electronically obtain formal approvals for project activities (for rese...	12,5%	12,5%	
1 provide software tool to manage the department data (by own staff)	11,8%	12,0%	
6 provide software tool to generate reports on scientific indicators	9,1%	10,0%	
4 provide software tool to allow reporting of scientific indicators (by researchers)	6,1%	7,8%	
7 provide software tool to estimate cash flow for ongoing research projects	3,0%	5,6%	
8 generate reports on scientific indicators (for the university and faculties)	2,8%	5,4%	
Most important item:	32,6%		
Least important item:	2,8%		

Figure 2. The AHP analysis

After the AHP analysis, the next step was the identification of the processes that take place within the department selected in the study. At the moment of our analysis, we identified the following main processes:

1. the support given to the process of running the project activities according to the budget limits of the research project and in accordance with the requirements of the grant agreement;
2. providing financial data on each research project;
3. the support given to the process of contracting research projects;
4. the support for preparing the documents required for the good implementation of the projects;
5. the process for reporting the stages of research projects;
6. the support process in completing interim and final reports on international projects;
7. the spreading of the information about new national and international competitions of projects;
8. providing information for reporting the scientific indicators.

A link matrix between the requirements and the processes was defined in the next step. The results of this analysis are shown in Figure 3.

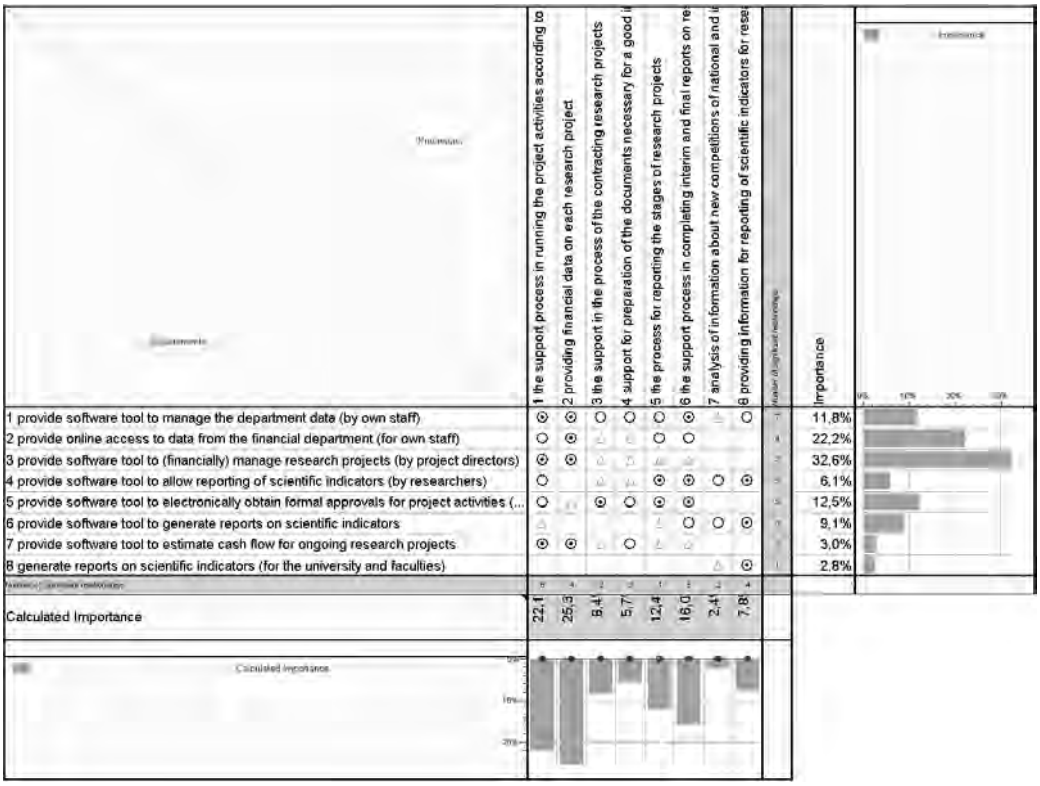

Figure 3. The matrix between the requirements and the processes

After the ranking of the processes and their importance, the next step was to establish the KPIs per process. Thus, for process1 the KPIs are: the number of record sheets for each research project per year (KPI 1) and the number of payment requests submitted to the coordinator of each project per year (KPI 2). For process 2 they are: the number of financial records per project for each month (KPI 3) and the frequency of informing the project managers (by e-mail, by telephone, etc.) about the project status (KPI 4). In the case of process 3 the KPIs are: the number of national research projects funded per year (KPI 5) and the number of international research projects financed per year (KPI 6). For process 4 the most important KPIs are: the number of monthly incoming documents at the department (KPI 7) and the number of formal approvals for project activities (for researchers, KPI 8). For process 5 the only KPI of importance is the number of reports per year on the stages of research projects (KPI 9). For process 6 the KPIs are the number of audit certificates issued for national projects per year (KPI 10) and the number of financial reports for international projects per year (KPI 11). Process 7 has two KPIs: the frequency of accessing the information sources for new competitions

(KPI 12) and the frequency of informing the researchers about these new competitions (KPI 13). Last but not least, process 8 has two important KPIs, namely: the numbers of articles published in ISI Journals and SCOPUS per year (KPI 14) and the income per year resulting from research (KPI 15).

The link matrix between the requirements and the KPIs per process was defined in the next step. The results of this analysis are shown in Figure 4.

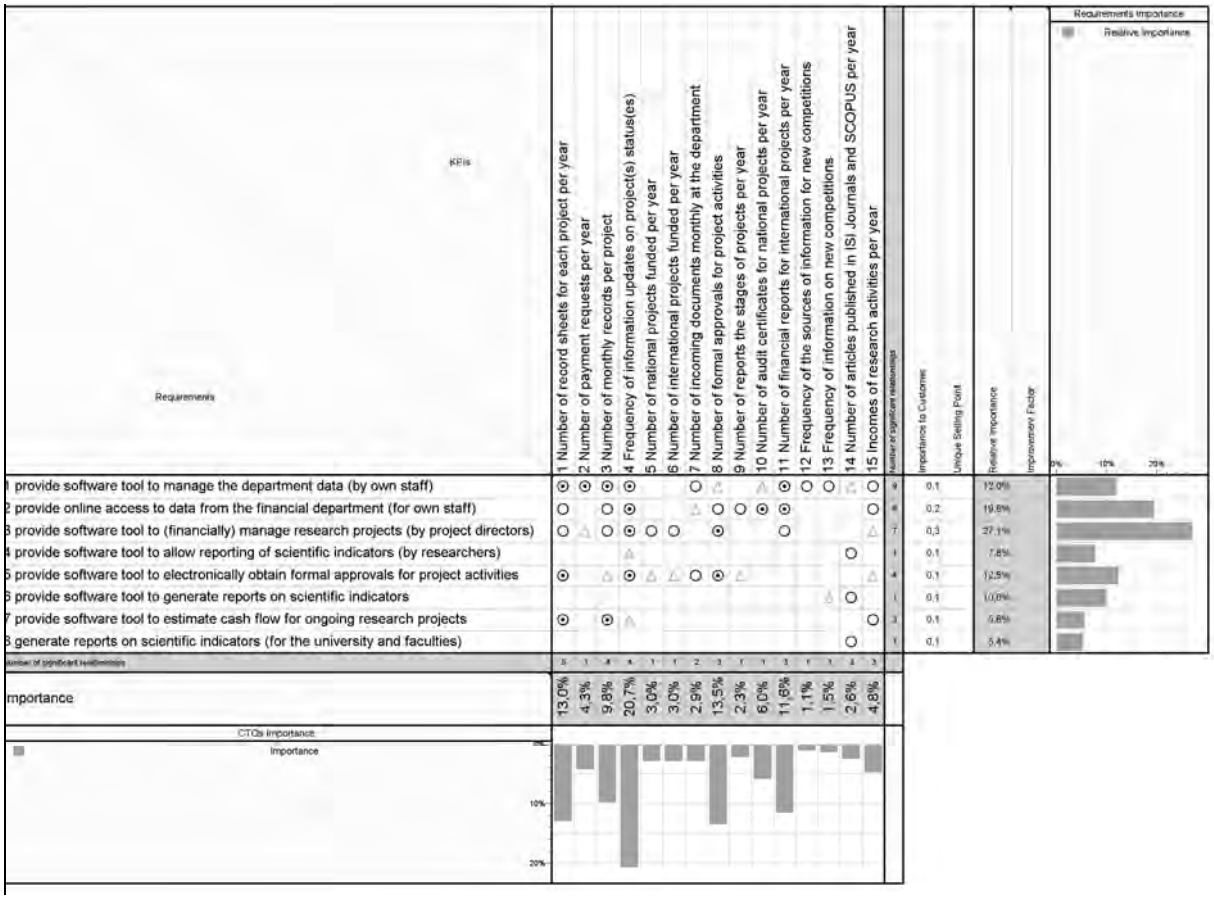

Figure 4. The matrix between the requirements and KPIs

The next step was established in prioritizing the KPIs / process which measure the current performance of the processes within the selected department. Also, the target values was established on each KPIs/process. The data set of KPIs is shown in table 1.

Table 1. The measure of the KPIs for the department

KPI	Description	Measure	Target value
KPI 4	Frequency of information updates project(s) status	10	20
KPI 8	The number of formal approvals for project activities	20	50
KPI 1	The number of record sheets for each project per year	250	300
KPI 11	The number of financial reports for international projects per year	50	100
KPI 3	The number of monthly records per project	150	200
KPI 10	The number of audit certificates for national projects per year	110	180
KPI 15	The incomes of research activities per year	20000	30000
KPI 2	The number of payment requests per year	1000	1500
KPI 5	The number of national projects funded per year	110	200

Finally, in the last step some projects was proposed to achieve the target values of KPIs. In accordance with the results shown in table 1, the frequency of informing the project managers (by e-mail, by telephone, etc.) about the project status (KPI 4) and the number of formal approvals for project activities (KPI 8), it means that the researchers from the university should be more informed about research projects statuses. They could be helped by good information about ongoing competitions at time and before the deadline for submission. Increasing the participation and access of European and national funds it could be a good justification for attracting the income resulting from research to the university (KPI 15) and the number of payment requests submitted to the coordinator of each project (KPI 2). If the university has more research projects, the KPI 3, KPI 1, KPI 10 and KPI 11 could increase to achieve the target values of KPIs. The results of research, development and innovation projects can be capitalized by increasing the number of national research projects funded per year (KPI 5).The increase in KPI 5 means the improving collaboration between the researches and the staff of department for the administration and monitoring of projects.

The criteria for prioritizing the projects were defined as follows: the frequency of information of the researches, the difficulty of implementation and completion, and the eligible costs. After defining the criteria, the first project is the designing of a software tool for management of research projects. The valuable requirements for this project are: the good knowledge's staff about competitions, the providing a software tool to manage research projects, and the informing the project managers about the project status as many times as needed.

The second project is the coordination of activities related to the administration and monitoring of research projects within the online access to data from the financial department of the university. This project is good for the collection of data necessary to prepare the financial reports and to generate the audit certificates for each project.

The third project is the increasing of participation and access of the funds from national and international competitions, as well as those derived from economic environment through a better collaboration between the research structures from TUCN.

Conclusions

This research proposes a new approach for the performance management in higher education institutions. The methodology, based on the process-oriented approach in universities, could be implemented for measuring, evaluating and improving such services as the educational delivery, quality research and professional services. The AHP and QFD methods are applied in this analysis and their results contribute to the measurement the current performance of the processes within a certain department from TUCN. Three projects are proposed in this study and some concrete solutions were found, namely: allocating more time to informing the project managers about the project status as many times as needed and the formal approvals for project activities, to regular meetings between staff and the manager for resolving issues in a timely manner and to breaking communication gaps between the management team, the research structures and the department staff. The present study also aims to encourage universities to improve their performance and thinking about the managerial proposes to which performance management based on the process-oriented might contribute these measure. Also, this framework is just a new approach that depending on subjective factors, such as the support of top management for implementation.

References

Aytac, A., & Deniz, V.
2005
"Quality function deployment in education: a curriculum review". Quality and Quantity, Vol.39, pp.507-514.
Badawy, M., Abd EL-Aziz, A., Idress, A., Hefny, H., & Hossam, S.
2016
"A survey on exploring key performance indicators". Future Computing and Informatics Journal I, pp.47-52.
Behn, R.
2003
"Why measure performance? Different purposes require different measures". Public Administration Review, Vol.63, No.5, pp.586-606.

Darwin, S.
2012
“Moving beyond face value: re-envisioning higher education evaluation as a generator of professional knowledge”. Assessment&Evaluation in Higher Education Vol.37 No.6, pp.733-745.
Kaplan, R., & Norton, D.
2005
“The balanced score card: measures that drive performance”. Harvard BusinessReview, Vol.8 No.3, pp.174-180.
McCormack, K., & Johnson, W.
2001
“Business process orientation – gaining the E-business competitive advantage”. CRC Press.
Neely, A., Gregory, M., & Platts, K.
2005
“Performance measurement system design”. International Journal of Operations&Production Management, Vol.25 No.12, pp.1228-1263.
Parasuraman, A., Zeithaml, V., & Berry, L.
1988
“SERVQUAL: a multiple item scale for measuring consumer perceptions of service quality”. Journal of Retailing, Vol.64, No.1, pp.12-40.
Stufflebeam, D., & Shinkfield, A.
2007
“Evaluation Theory, Models, &Applications”. San Francisco, CA.: Jossey-Bass.
UTCN
2018
Universitatea Tehnica Cluj Napoca/ Cercetare. Retrieved 30.08.2018 from https://research.utcluj.ro/index.php/strategia-de-cercetare.html
Zhival, A.
2017
“The use of performance measurement in universities”. International Journal of Public Sector Management, Vol.30 Issue: 2, pp.102-117.

MANAGERIAL PRACTICE FACING THE DEMANDS OF RELIGIOUS MORALITY. ARE THE LATTER A LIMITING FACTOR OR A LEADING TO PERFORMANCE ONE?

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Abstract

Purpose *–The paper is aiming to discuss if the moral demands of the three major world religions: Judaism, Christianity and Islam are likely to act as a limiting factor or a supportive one of managerial performance.*

Methodology/approach *– An extensive literature review on performance management and measurement allows to identify a set of the main characteristics of a so-called "Secular Based Framework" grounded on the most cited models and frameworks in the field. By 'loading' this framework with the basic teachings of the main world religious traditions, a "Religion Based Framework" is delineated.*

Findings *–The basic concepts and moral demands of the religious teachings are supporting a holistic accountable peformance management system.*

Research limitations/implications *– The research was limited by the speculative aspect of the approach.*

Practical implications *– The proposed dimensions shaping the Religion Based Framework are a good starting point for further developments, and exploratory research as well, in the field of performance management and measurement.*

Originality/value *– The main features of a Secular Based Framework of performance management and a Religion Based Framework are delineated. Both frameworks provide added value to the research field.*

Key words:*.religious morality, management performance*

Introduction

In the last decades, under the circumstances of a fierce global competition, performance management has gained more and more attention from both academics and practitioners, being considered critical in managing individuals, teams, organizations and institutions. On the other hand, building–up long term sustainable business imposes the integration of moral components in the business philosophy. In this respect, the emerging field of business ethics and the various forms of Corporate Social Responsibility are a good sign that business world becomes more and more aware about its accountability in the ways companies are operating, and caring for the environment. Taking as a starting point of our research, the binomial contains between on the one hand, the imperatives of effectiveness, efficiency, effort maximisation and on the other hand, the need to act in a moral and accountable manner, the present paper aims to discuss how can address a business ethics underpined in the religion morality the endeavour of attaining managerial performance. In line with this purpose, a comparison between a so-called "Secular Based Framework" (SBF) of performance management and a "Religion Based Framework" (RBF) is provided.

Literature review on performance management and religion ethics

1. Performance management and measurement models and frameworks

A literature review of the last decades on the subject presents the general concept of performance management (PM) and its related branches (e.g. performance measurement models and frameworks, performance excellence, key performance indicators) as a dynamic one. The statement is not trivial, as several authors ascertain it a dynamic development, either presenting it being subject of a paradigma shift (Jones, 1999), or even of a revolutionary process (Neely, 1999; Dresner, 2008).

On a logical course of the present research, the definitions formulated in scientific papers and books by various authors provide us a first glance on the subject. Though, Striteska and Spickova (2012) stresses with good reason the notional differences between performance management (systems) and performance measurement, the latter being just one of "many esential components that form together a performance management system" (p.2), and as the performance measurement tools provided by various authors are much more numerous than performance management systems, most of the performance measurment models and frameworks revealing their theoretical backgrounds, for the purposes of the present paper we are addressing both of them, under the joint label of 'performance management and measurement (PMM)'.

In dealing firstly with the core of a performance management (system), it is found to be a "process by which the company manages its performance in line with its corporate and functional strategies and objectives" (Bititci, Carrie, and McDevitt, 1997); "the potential for future successful implementation of actions in order to reach the objectives and targets" (Lebas, M. J., 1995); "the systematic process by which an agency involves its employees, as individuals and members of a group, in improving organizational effectiveness in the accomplishment of agency mission and goal" or "the integration of performance appraisal systems with broader human resource systems as a means of aligning employees, work behavior with the organization's goals" (Ghosh and Das, 2013); "a continuous process of identifying, measuring and developing the performance of individuals and aligning performance with the strategic goals of the organization" (Aguinis, 2007).

For its part, as quoted by Striteska and Spickova (2012), the performance measurement is understood as "the process of quantifying the efficiency and effectiveness of past actions" (Neely et al., 2002), or "evaluating how well organisations are managed and the value they deliver for customers and other stakeholders" (Moullin, 2003).

A significant amount of conceptual models and frameworks for measuring performance management have been emerged so far, several reviews in the form of research papers, books or book chapters, master or doctoral theses being available and emphasizing various facets according to the respective research interest. This paper draws on eleven such literature reviews, covering a time period between 1995 and 2016. Among these, Neely et al. (1995), and Neely et al. (2000) proceed to an extensive analysis of the existing performance measurement system design, providing a practical 12-phases guide. Gomes et al. (2004) work out an extensive literature review on manufacturing performance measures, analysing 154 relevant papers on the subject. Pun & White (2005) provide also a review of the existing performance measurement systems and frameworks, analysing more in detail a set of ten PM systems and approaches. Taticchi & Balachandran (2008), and Taticchi et al. (2010) are providing the most comprehensive lists of the emerged performance assessment tools, i.e. 25, 43 respectively, the latter study splitting them into those for large companies (25) and those for SMEs (18), respectively. Striteska & Spickova (2012) analyse the strong and weak points of seven performance measurement systems, providing also a set of main characteristics and requirements for adopting a universally accepted PMM, according to their findings in literature review: to ensure an overall image of the business, and a concise overview of the organizations' performance, to fit well in the organisations' function and hierarchy, to be directed to the past and future achievements, to reflect both financial and non-financial aspects, to encompass the strategy, the objectives, and the critical success factors, to be flexible, and linked to reward systems. Bititci (2015) reviews a set of ten "popular performance measurement models and frameworks", presenting their main strength and criticisms, Gosh & Das (2013) delineate six performance management and measurement models in order to sketch a new model, more appropriate for the higher education field. Ivanov & Avasilcăi (2014) analize a set of four performance measurement models in an attempt to analyse the innovation process performance, Agbanu et al. (2016) are providing a deeeper insight of five contemporary performance metrics, aiming for their part, to measure the strategic performance in state-owned

organization, and Carneiro-da-Cuhna et. al. (2016) present a historical account of the evolution of the organizational performance measurement field, tracing its trends and developments from the outlook of several criteria. So, the field changed from a performance measurement focus to a performance management one, from an operational and functional perspective to a strategic and systemic one, enlarged its scope from primarily financial aspects only, to a multidimensional and more balanced approach, increased it amplitude from internal orientation toward external ones, changed from a transactional nature to a relational one, and finally, if assuming first its accountability only on shareholders, extends it later toward all stakeholders.

2. Religious morality and business

The relationship between morality and business practices has also gained a large interest, mostly, but not exclusively, under the issue of business ethics, or the more specific work ethics, a significat amount of papers and books drawing their attention on the subject, either through the lens of the teachings of the religion faiths, or from a more secular point of view. As far as it goes the specific focus of the present paper, several studies have looked upon the subject from the perspective of the values and behavioral norms of the three major Abrahamic religions, i.e. Judaism, Christianity, and Islam. Thus, Quddus et al. (2009) presents the common ground on how Christianity, Islam and Judaism prohibit immoral conduct as bribery, fraud and cheating, discrimination, corruption, injustice and damaging the rights of employees, customers and other stakeholders. Ali & Gibbs (1998) give an insight how the behavioral norms stated in the Ten Commandments are perceived in different ways by jews, christians, and muslims, and provides an interpretation of the commandments for the present-day business operations.

Other studies offer an outlook from one particular faith tradition. So, Pava (1998), Epstein (2000), and Schwartz (2012) provide essential insights for understanding the foundations of the jewish busniess ethics. Limiting our account only on Epstein's (2000) review on Tamari's and Pava's contributions to the field, it is worth to recall some specific aspects of economic life included in his analysis: "competition, prices, and profits; wages and labor; money, banking, and interest; taxation; welfare; environmental issues and the public good". For their part, Bay et al. (2011) proceed to a historical account of how Christianity viewed key aspects of business ethics through ages, focusing its attention to the "purpose of work, ownership of land, amassing wealth, charging interest on loans and conducting trade, and making profits", while Melé and Fontrodona (2016) stresses the valuable contributions Christian ethics and spirituality can offer to both business organizations and business education. For their part, Azmi (2005) and Ali (2015) round and complete our insights, from an Islamic perspective.

Not only authors coming from a particular faith tradition leaned on the subject, but also more "public" voices took stance towards the need of ethic codes in international business. It it worth to mention here the Declaration Toward a Global Ethic of the Parliament of World's Religions (1993) that stresses the need of a new global ethic, and the commitment to a four-dimensional culture, including "non-violence and respect of life, solidarity and a just economic order, tolerance and a life of truthfulness, and equal rights and partnership between men and women". The Interfaith Declaration: A Code of Ethics on International Business for Christians, Muslims, and Jews (1994) stresses for its part, the importance of applying a set of four principles emerged from the "common basis of religious moral teachings [of] the People of the Book: … justice (fairness), mutual respect (love and consideration), stewardship (trusteeship) and honesty (truthfulness)", and draws moral guidelines in three fields of the economical life (business and political economy, policies of business, and the conduct of individuals at work). Related to the expressed concern of the various PMM models and frameworks toward all kind of stakeholders, it is worth to be noted that the above guidelines are addressing six particular stakeholders, among them being the employees, the providers of finance, the customers, the suppliers, the community (local and national government), and the owners (shareholders). Another public document concludes that "businesses should abide by principles of mutual respect, stewardship, honesty, trustfulness, justice, interdependence, caring for the poor, protection of human dignity, legitimacy of business and profit that serves the interests of society, obligation to avoid fraud, obligation for timely payments and stable and honest prices" (Global Forum on Law Justice and Development, 2017).

Several studies draw their attention on the more specific work ethics from the perspective of one major religion tradition, but few are addressing the issues of organizational performance. In an exploratory research paper, Ali (2001) conducts a survay in Saudi Arabia, finding out "high commitment of

managers to the to the Islamic Work Ethics (IWE) and a moderate tendency to individualism"; in another paper, Ali and Al-Owaihan (2008) findings stress the multifaceted dimensions of IWE (economic, moral, and social), comprising four elements: "effort, competition, transparency, and morally responsible conduct", and argue also that "IWE seem to provide the faithful with a sense of worthiness and strengthen organizational commitment and continuity, …, [and that], work is viewed not as an end in itself, but as a means to foster personal growth and social relations." In line with the purpose of the present paper, and what we deliniated above citing the Epstein's (2000) review on Tamari's and Pava's contributions to the jewish business ethics, and Bay's et al. (2011) ones respectively, it is worth to mention that relying on a former study (Ali, 2005), the cited autors strengthen a set of eleven instructions Prophet Mohamed related to work and business issues: "(1) Pursuing legitimate business; (2) Wealth must be earned; (3) Quality of work ; (4) Wages; (5) Reliance on self; (6) Monopoly; (7) Bribery; (8) Deeds and intentions; (9) Transparency; (10) Greed; (11) Generosity."

Closer to our proposed research field, Imam et al. (2015) relate the Islamic Work Ethics to the employee performance by the mediating role of personality X and Y, and the employee characteristics, while Zahrah et al. (2016) interpose the islamic religiosity as a mediator between the Islamic Work Ethics and job performance.

Finally, other studies broaden the spectrum of their research, turning their attention to the impact of spirituality enriched forms of leadership, i.e. servant leadership (Melchar, and Bosco, 2010), spiritual leadership (Fry et al. 2011) on the organizational performance, or to how the relative new approach of workplace spirituality supports the organizational performance (Karakas, 2010). Thou the impact of above mentioned forms of leadership or workplace spiritualitay lay beyond the scope of the present paper, they are worth to be mentioned in order to give a glimpse of the large development potential of this research field.

Research questions and method

Based upon the above reviewed literature in both fields of performance management and measurement (PMM), and religious morality related to business practices, the following two research questions were formulated:

1. How can be fitted the religion values and behavioral norms of the three major monotheistic faiths into a performance management and measurement model or framework ?
2. Would the embedding of such a set of religion values and behavioral norms act as a limiting factor, or rather lead to an enhancement of the organziational performance ?

In order to answer to the above two research questions, we adopted the following methodology.

i) First stage was to establish a "short-list" of the most cited performance management and measurement models and frameworks based upon their occurrence frequency in the reviewed literature.

In order to accomplish this prerequisite, we collected initially an overall amount of 53 PMM models and frameworks provided by ten reviews, and counted for each the number of occurences, in order to establish a "short-list" of the most cited ones. Applying this procedure, the Strategic Measurement Analysis and Reporting Technique - ***SMART*** / Performance Pyramid (Cross and Lynch, 1988) and the Balanced Scorecard – ***BSC*** (Kaplan and Norton, 1992) colected nine occurrences each, followed by the Supportive Performance Measures / Performance Management Matrix - ***PMM*** (Keegan et al., 1989), the Performance Prism - ***PP*** (Neely et al., 2001), and the Business Excellence Model - ***BEM*** (EFQM, 2007), each with six occurences, the Performance Measurement Questionnaire - **PMQ** (Dixon et al., 1990), the Results and Determinants Framework - ***RDF*** (Fitzgerald et al. 1991), the Cambridge Performance Measurement Framework – ***CPMF*** (Neely et al., 1996), the Integrated Performance Measurement System – ***IPMS*** (Bititci et al., 1997), the Comparative Business Scorecard - ***CBS*** (Kanji, 1998), and the Dynamic Performance Measurement System - ***DPMS*** (Bititci et al., 2000) each with four, while all other models and frameworks didn't exceed three occurences. As we didn't impose other filtering criteria besides the "performance management and measure" keywords, we presume that thou we had limited our research to just eleven reviews, a more extensive research engaging additional reviews would rise some of the lower occurences and push forward those with the highest

ones, maintaining or even increasing this difference, this tendency being noticed by the authors of the present paper as the data accumulated. Based upon the above described procedure, we qualified those with at least four occurrences, obtaining a "short-list" containing eleven PMM models and frameworks to be analysed in a second stage.

ii) Based upon the above "short-list", we identified a set of general chracteristics of the reviewed performance management and measurement models and frameworks, which can be assigned to a so-called "Secular Based Framework" (SBF) of performance management. The findings are given in the left column of Table 1.

iii) After having at hand the sketched SBF we analysed to what extent the values and behavioural norms taught by the three major Abrahamic religions are addressing SBF's identified characteristics, in order to establish the main features of a "Religion Based Framework" (RBF) of performance management, underpinned by the moral teachings of the three major monotheistic traditions: Judaism, Christianity, and Islam. The findings are given in the right column of Table 1.

Table 1. "Secular Based Framework" (SBF) vs. "Religion Based Framework" (RBF)

"Secular Based Framework" (SBF)	***"Religion Based Framework" (RBF)***
• the more and more integrative (holistic) view of PMM (Striteska and Spickova, 2012; Carneiro-da-Cuhna et. al., 2016); • PMM viewed as a systematic and continuous process (Gosh and Das, 2013; Aguinis, 2007; Neely et al., 2002); • the need to include the strategy on different hierarchical levels (BSC) and to integrate the strategic objectives and the operational dimensions (SMART); • the need of formulating the frameworks' components in measurable terms; • balance between various concerns: financial, and non-financial, internal and external facets (BSC, PMM, CPFM); • "consistency between firm's startegy, improvement actions and measures" (Bititci, 2015, PMQ) • balance between short and long term orientation: financial vs. markets (SMART); • balance between all stakeholders (PP, CBS); • the need of flexibility (RDF), adaptability, ability to be renew in accordance with internal and external changes (BEM); • make use of IT in monitoring the subsystems (DPMS); • the importance of leadership (BEM); • the importance of real, active communication with all stakeholders; • the importance of continuous learning for competence building and innovation (BEM, RDF), "developing a culture of continous improving (Pun & White, 2005, CBS) .	• the most holistic view on business pursuit by including God as an Active Stakeholder (Schwartz, 2006); • relying on a religion based anthropology and the consequences that follow herefrom; • doctrinal differences of man's role in creation among the three major religion traditions (ali and Gibbs, 1998); • sacrality of life; • importance of good deeds: • considering God as the true "Owner of All Creation and the Source of All Wealth" (Epstein, 2000; Sumer, 2012); • man is called to be a responsible steward (Judeo-Christian tradition), or a vice-regent (Islam); • an inverted logic in how humans have to pursue success (Matt. 6:33); • moral commandments in both private and organizational life, being promulgated by God, are compulsory for everyone; • strongly prohibition of immoral conduct in both private and business life; • clearly defined requirements for a good leadership; • importance of delivering quality work; • restrictions in how a subject is spending its wealth (Sumer, 2012); • concern for those in needs; • high importance of the community (Pava, 1998); • concern for environmental issues.

Discussion, conclusions, limitations, and future research

In order to answer our first research question, '*How can be fitted the religion values and behavioral norms of the three major monotheistic faiths into a performance management and measurement model or framework ?*', it was necessary to get primarly an insight what is performance management and measurement all about. Based on an extensive literature review in the field, we could sketch a so-called "Secular Based Framework" (SBF). Its main characteristics are given in the left side of Table 1. As one can easily notice, these features are in line both with Striteska & Spickova's (2012) findings, and with the present-day stages attained by the PMM approaches in their historical evolution traced by Carneiro-da-Cuhna et. al. (2016). In order to relate these findings to the reviewed PMM models and frameworks contained in the short-list, every statement is followed, as possible, by its related acronyms, and/or sources.

One of the major difficulties faced by scholars in addressing the nowerdays challenges of the business ethics through the lens of the moral teachings provided by religions' traditions is how to apply the "these general principles useable approaches to resolving ethically vexing economic or business issues in the here and now" (Epstein, 2000). The same paper cites hereto Pava's proposal to make use of the 'interpretation method', which "means analyzing contemporary real-world situations against the backdrop of precedent—prior pertinent cases—from which relevant principles can be extrapolated and applied in present-day contexts" (Epstein, 2000).

Besides, the above considerations, in building-up any proposal for a possible "Religion Based Framework" (RBF) of performance management we have to stress first and foremost the different foundation on such a framework rely as against a "secular" one. We may synthesize these premises at least by two basic assertion : (1) the belief of monotheistic religions of the existence of a God that manifests Itself as an Active Stakeholder, and being an Omniscient, Omnipresent, All-wise and All-Seeing Spiritual Person, and (2) a common anthropology has been based on the faith of man's appearance as God's creation and the consequences that follow herefrom.

It is also worth to emphasize the specific doctrinal differences among the discussed three monotheistic religions, for instance about man's role in creation: the complete creation, "to perfect what God has not completed" (e.g. tikkun olam concept) in Judaism, to resemble in holiness with God in Christianity, to keep a balance between worship and duties in the earthly life in Islam (Ali and Gibbs, 1998).

Despite these inherent doctrinal variations, the assumption that moral commandments in both private and organizational life, are promulgated by God and not only spurred as the effect of social evolution, lead them to be compulsory for everyone. Moreover, as "God is the Owner of All Creation and the Source of All Wealth" (Epstein, 2000), man is called to be a responsible steward in the judeo-christian tradition, or a vice-regent in Islam.

Going deeper into the subject, a reasonable question that arise is related to the legitimacy of business pursuit. In what concerns Judaism, "economic enterprise is an essential, but not the defining, aspect of human endeavor,…, and business activity and profit are legitimate" (Epstein, 2000). For Christianity, business was not a primacy of a worldly life, its reluctance being generated especially due to the pitfalls in which the human being could be attracted in its endeavour towards a life in holiness according to Christ's model. As seen above, we may notice a dynamic of the way Christianity viewed key aspects of business ethics through ages (Bay et al., 2011). For muslims, business and trade has a strong tradition, coming even from pre-islamic times. After receiving Quran, freedom of enterprise is limited by islamic Shari'ah, strongfuly emphasizing what earnings are lawful (Halal) and what not (Azmi, 2005). In close relationship with business endeavor stays also amassing wealth, and how it is spent.

Another important aspect to be dealt with is about work and its related issues (meaning of work, concern for quality work, wages). Despite the various stances taken by their followers throughout history toward human work, the teachings of all three main religious traditions highly value it. There are many places in the texts of the Sacred Books that references to importance, appreciation, respect for labor: "the substance of a diligent man is precious" (Prov. 12:27); "The one who is unwilling to work shall not eat" (2 Thess 3:10); "Worshiping has seventy avenues; the best of them is the involvement in an honestly earned living''. That is, work is the best form of worshiping." (Ali and Al-Owaihan, 2008).

The interrelation between quality of work and receiving a fair wage for it is paramount in the three discussed religious traditions. "… employment is seen as a contractual relationship involving the purchase and sale of services, …, and the worker is accorded special protection regarding wages and working conditions but has the obligation to render honest value for wages received." (Epstein, 2000). The New Testament emphasis for its part this condition: "The worker deserves his wages." (1 Tim. 5,18). The compensation of workers has to be fair, just, and prompt: ''One must give a worker his wage before his sweat dries (should be given on time)'' and ''your wage should be based on your effort and spending'' and "denying a worker his/her full wage to be an immoral act. He was quoted saying that he would personally plead against, ''He who received work from a laborer and did not pay him in full". (Ali and Al-Owaihan, 2008). A quality of work presupposes also discipline and commitment of the subjects.

Thou important, as banking, interest and taxation deals more with the general settlement of the society in which companies are running their business, a discussion of these issues is not intended by the

authors of the present paper. Even thou, all above discussed religions condemn tax evasion, considering it “a theft from the community” in Judaism (Epstein, 2000), a transgression from Christ’s commandment (Luke 20:25, Romans 13:6-7) in Christianty and an immoral act in Islam. Another facet of this issue covers the contributions of the adherents especially for those in needs. Epstein (2000) argues that jewish tihing is “an integral aspect of the taxation systems”, while McGee (1998) stresses the “moral obligation to pay zakat for the support of the poor and for the legitimate functions of government” in Islam.

As stated above by Quddus et al. (2009), based on most relevant scriptural quotations, all these three religious traditions strongly prohibit immoral conduct as bribery, fraud and cheating, discrimination, corruption, injustice and damaging the rights of employees, customers and other stakeholders.

As some of the selected secular based frameworks of performance management stress also the issue of leadership (EFQM), we support that each of the above religious traditions emphasize the importance of a good leadrship too. Among the virtues a leader has to express by saying and living, vision, reliance on God, integrity, truthfulness, modesty, and carrying for the people are paramount. Christianity went a little bit more in these requirments, by the worldwide known quote “whosoever of you will be the chiefest, shall be servant of all” (Mark, 10:44), which inspired the servant leadership theory.

The benefits of saying the truth (transparency) and flexibility in dealing with others is also addressed by the large sets of values and moral behaviours promoted by the three religious teachings. One of Tirmididhi’s hadiths records that the Prophet have said “truth is peace of mind and falsehood is doubt (Sumer, 2012). The Jewish Talmud teaches that “one should always be as flexible as a reed: and not be rigid as a cedar” (Taanit 20, in Elkins, 2007).

All above religions stress the importance of learning and teaching, and pursuing general knowledge and in particular their religious doctrines (Elkins, 2007; Sumer, 2012).

After the above land preparation, we may answer to the second research question, if ‘embedding the secular based framework with the sets of religion values and behavioral norms would act as a limiting factor, or rather lead to an enhancement of the organziational performance ?’

In answering to this question, some may argue that business has its own operating rules, and a real application of business ethics principles and norms on business pursuit may prove as ineffective, or with other words, “two sets of morals, one for business, and one for private life, is an inescapable reality” (Rae & Wong, 2004). But our question is if a business conduct in accordance with the moral teachings of the three discussed world religions is capable to lead to enhancing all kind of performance: individual, team, organizational, and institutional. Based on above delineated aspects, our answer is positive.

Concluding what was said above, the extensive literature on performance management and measurement gathered together across decades emerged a considerable amount of performance models and frameworks. Among these, the most cited ones enabled the present authors to identify a set of main characteristics of a Secular Based Framework (SBF) of performance management. On the other hand, after delineating some of the essential doctrinal foundations of the three major world religions, i.e. Judaism, Christianity, and Islam, including their inherent distinct outlooks toward both private and business life, the authors searched to what extent can the moral teachings of these major world religious traditions be related to the components of the above sketched SBF. It was found that most of them can be addressed by the religious moral teachings, despite an autonomy tendency of the business environment towards a self-governing field relying on own principles, not necessarily from mischief motives, but being more a result of the continous pursuit for efficency, effectivness in a fierce competitive global environment. Under these circumstances, abibding by the divine given moral comandments of the religious teachings, despite the difficulty of applying ancient models to the nowaday context, can only contribute to a healthier, more just, balanced and on long-term oriented business pursuit, leading to what we may call a ‘holistic accountable peformance management system’.

An by the authors assumed limitation of the present paper was to deal exclusively with the basic teachings provided by the three major monotheistic world religions. Due to inherent space limitation, it was not possible to include in the debate more relevant aspects provided by vast literature of

rabbinical writings, Christian Social Thought (Lungu and Lungu, 2014), Tradition of Eastern Orthodoxy Church and of the many hadiths collections.

Other further developments may make use of the large amount of literature available in the field of the religion and/or spirituality inspired approaches to leadership (servant, and spiritual leadership), as well of workplace spirituality by including this research findings into the performance management process and integrating their specific set of performance indicators in the larger set of the key of performance indicators (KPI) ussualy used by business corporations. Even thou, the need for exploratory reasearch of additional driving forces, and mediating and moderating factors on performance management originating from a more holistic outlook, is of great evidence.

References

Agbanu, P.G, Nayrko, I.K., Agbemava, E., Sedzro, E., Selase, E.
2016
Measuring Strategic Performance in State-owned Organizations: An Evaluation of Five Proposed Contemporary Metrics, International Journal of Scientific and Research Publications, Volume 6, Issue 3, pp. 138-153
Aguinis, H.
2007
Performance Management, 3rd edition, Pearson Education Inc
Ali, A.J.
2001
The Islamic Work Ethic in Arabia, The Journal of Psychology, 126(5), pp. 507-519
Ali, A.J., Al-Owaihan, A.
2008
Islamic work ethic: a critical review, Cross Cultural Management: An International Journal Vol. 15 No. 1, 2008 pp. 5-19
Ali, A.J., and Gibbs, M.
1998
Foundation of business ethics in contemporary religious thought: the Ten Commandment perspective, International Journal of Social Economics, Vol. 25 No. 10, , pp. 1552-1564
Azmi, S.
2005
An Islamic approach to business ethics. Renaissance, online: http://www.monthly-renaissance.com/issue/content.aspx?id=169
Bititci, U.S.
2015
Managing Business Performance: The Science and The Art. Appendix. Overview of Popular Performance Measurement Models and Frameworks, John Wiley & Sons, Ltd., 2015, pp. 254-262
Bititci, U.S., Carrie, A. S., and McDevitt, L.
1997
"Integrated performance measurement systems: a development guide", International Journal of Operations & Production Management, Vol. 17 Issue: 5, pp. 522-534
Carneiro-da-Cunha, J.A., Hourneaux F. Jr., Correa, H.L.
2016
Evolution and chronology of the organisational performance measurement field, Int. J. Business Performance Management, Vol. 17, No. 2, pp. 223-240
Dresner, H
2008
The Performance Management Revolution: Business Results Through Insight and Action, John Wiley & Sons, Inc.
Elkins, P.D.
2007
The Wisdom of Judaism: An Introduction to the Values of the Talmud, Jewish Lights Publishing
Epstein, E.A.
2000
Contemporary Jewish Perspectives on Business Ethics: The Contribution of Meir Tamari and Moses L. Pava: A Review Essay, Business Ethics Quarterly, Vol. 10, No. 2, pp. 523-541
Fry, L.W., Hannah S.T., Noel, M., Walumbwa, F.O.
2011
Impact of spiritual leadership on unit performance, The Leadership Quarterly 22, pp. 259-270

Ghosh, S., Das, N.
2013
New Model of Performance Management and Measurement in Higher Education Sector, IJSR – International Journal of Scientific Research, Volume : 2, Issue 8, pp. 267-274
Global Forum on Law Justice and Development
2017
HCBM Brief. Ethical and Moral HCBM Principles and the major world religions, http://www.globalforumljd.org/sites/default/files/docs/cop/HCBM-Ethical%20and%20Moral%20Principles%20and%20World%20Religions_Brief%202Oct2017.pdf
Gomes, C. F., Yasin, M.M., and Lisboa, J. V.
2004
A literature review of manufacturing performance measures and measurement in an organizational context: a framework and direction for future research, Journal of Manufacturing Technology Management, Vol. 15 Iss: 6 pp. 511 - 530
Imam, A., A. S. Abbasi, and S. Muneer
2015
"Employee performance from the lens if Islamic work ethics: mediating role of personality X and Y" Sci. Int. (Lahore), 27(1), 415-422
Ivanov C.I., Avasilcăi, S.
2014
Performance measurement models: an analysis for measuring innovation processes performance, Procedia - Social and Behavioral Sciences 124, pp. 397 - 404
Jones, P.
1999
The Performance Management Pocketbook, Management Pocketbooks Ltd.
Kaplan, R. S., and David Norton, D.
1996
"Using the Balanced Scorecard as a Strategic Management System", Harvard Business Review 74, no. 1, pp. 75–85
Karakas, F.
2010
Spirituality and performance in organizations: a literature review, Journal of Business Ethics, 94(1), pp. 89-106
Lebas, M. J.
1995
Performance measurement and performance management, Int. J. Production Economics 41: pp. 23-35
Lungu, R., and Lungu, F.
2014
Corporate Social Responsibility and Christian Social Thought. Are they sharing commonalities or are they relat-ing to parallel worlds ?, Proceedings of the 4th Review of Management and Economic Engineering International Management Conference, "The Management Between Profit and Social Responsibility", Todesco Publishing House, Cluj-Napoca, Romania, pp. 75-87
McGee, R.W.
1998
The Ethics of Tax Evasion in Islam: A Comment, Journal of Accounting, Ethics & Public Policy, Volume 1, No. 2, pp. 162-169
Melchar, D.E., Bosco, S.M.
2010
Achieving High Organization Performance through Servant Leadership, The Journal of Business Inquiry, 9, 1, pp. 74-88
Melé, D., and Fontrodona, J.
2016
Christian Ethics and Spirituality in Leading Business Organizations. Editorial Introduction
Neely, A.
1999
The performance measurement revolution: why now and what next?, International Journal of Operations & Production Management, v.19, no.2, 1999 Feb, pp. 205-228
Neely, A., Gregory, M. and Platts, K.
1995
Performance measurement system design: a literature review and research agenda, International Journal of Operations & Production Management, Vol. 15, Iss. 4, pp. 80-116.

Neely, A., Mills, J., Platts, K., Richards, H., Gregory, M., Bourne, M. and Kennerley, M.
2000
Performance measurement system design: developing and testing a process-based approach. International journal of operations & production management, 20(10), pp.1119-1145.
Novia Zahrah, N., Hamid, S. N. B. A., Rani, S.H.B.A., Kamil, B.A.B.M.
2016
The Relationship between Islamic Religiosity, Islamic Work Ethics and Job Performance, The European Proceedings of Social & Behavioural Sciences, Future Academy, International Soft Science Conference
Parliament of the World's Religions
1993
Declaration toward a global ethic. Chicago, IL, USA, https://parliamentofreligions.org/pwr_resources/_includes/FCKcontent/File/TowardsAGlobalEthic.pdf
Pava, M.
1998
The Substance of Jewish Ethics, Journal of Business Ethics, 17 (6), pp. 603-61
Pun, K.F. and White, A. S.
2005
A performance measurement paradigm for integrating strategy formulation: A review of systems and frameworks, International Journal of Management Reviews Volume 7 Issue 1 pp. 49-71
Quddus, M., Henri Bailey, Ill, H. White, L.
2009
Business ethics: perspectives from Judaic, Christian, and Islamic scriptures, Journal of Management, Spirituality & Religion, 6:4, pp. 323-334
Rae, S.B., and Wong, K.L. (eds.)
2004
Beyond Integrity. A Judeo-Christian Approach to Business Ethics, 2nd edition, Zondervan
Rao, T.V., Rao, R., and Dixit, S.
2016
A Study of Leadership Roles, Styles, Delegation and Qualities of Indian CEOs, http://www.perfectprofessional.in/a-study-of-leadership-roles-styles-delegation-and-qualities-of-indian-ceos/
Schwartz, M.
2012
A Jewish Approach to Business Ethics, Philosophy Study, Vol. 2, No. 10, pp. 754-766
Schwartz, M.
2006
God as a Managerial Stakeholder ?, Journal of Business Ethics, 66, pp. 291–306
Striteska, M. and Spickova, M.
2012
Review and Comparison of Performance Measurement Systems, Journal of Organizational Management Studies, Vol. 2012, Article ID 114900,13 pages
Sumer, S.S.
2012
The Basic Values of Islam, AS Noordeen, Kuala Lumpur, Malaysia
Taticchi, P. and Balachandran K. R.
2008
Forward performance measurement and management integrated frameworks, International Journal of Accounting & Information Management, Vol. 16, Iss 2 pp. 140 – 154
***
1994
An Interfaith Declaration: A Code of Ethics on International Business for Christians, Muslims and Jews, https://s3.amazonaws.com/berkley-center/ 921130InterfaithDeclarationCode EthicsBusiness.pdf
***
2006
Coranul, trad. din limba arabă de George Grigore, Editura Herald, București
***
2016
The Holy Bible. King James Version, Hendrickson Publishers Marketing, LLC, Peadbody MA

SUSTAINABLE ECO DESIGN IN THE CONTEXT OF CIRCULAR ECONOMY IN ROMANIA

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Abstract

Purpose *– The aim of this paper is to identify the need of a different economic model on the background of price increasing in the raw material market. Economic entities can control its costs of production and maximize its profit while their processes, while improve their designs, improving supply chains and create an inverted supply chain process in order to reuse the materials contained in their own products. Redesigning classic business models can offers managers the skills necessary to generate profitability while taking into consideration the costs of production and distribution from logistics and inverted logistics right from the beginning of the production processes. The concept of circular economy means harmonizing the long-term sustainable development needs of humanity by optimizing resource consumption so as to scatter as little as possible and re-use it as much as possible.*

Methodology/approach *– Our research used empirical and statistic models. Our objective consists of a positive and constructive research to further deepening the researched field of circular economy system in Romania, relying on empirical and statistic models.*

Findings *– Sustainable eco design can help Romanian companies reuse or recycle their products. Determining direct and indirect costs regarding the production and distribution processes in the Romanian market, companies can decrees fix and variable costs and determine the required rate of return for the circular lifecycle of their own products*

Research limitations/implications *– Romanian companies missed important opportunities to improve the efficient use of resources by not implicating in the development of new sustainable design of products thus prolonging the lifecycle of their products, generating growth and jobs, which in turn would reduce greenhouse gas emissions and the Union's dependence on the issues imported raw materials.*

Practical implications *– Romanian must change the process of environmental permits stimulating private initiatives on waste management, an introduction of a waste traceability information system. Romania must develop and maintain active involvement of the producers or economic operators responsible for the education, awareness and involvement component.*

Originality/value *– Efficient use of resources and products within Romanian market and secondary reusable product markets leads to new growth opportunities, bringing net profits to Romanian businesses. Turning waste into resources or secondary raw materials is loop closure in future Romanian systems that will promote a circular sustainable business model.*

Key words: *circular eco design, circular economy, resources.*

Introduction

The concept of circular economy means harmonizing the long-term sustainable development needs of humanity by optimizing resource consumption so as to scatter as little as possible and re-use it as much as possible. Circular economy can be defined as a process in which production, consumption and trade are engendered in a model in which resources are minimized. The circular model can

diminish the consumption of fossil fuels, raw materials, water and land thus diminishing the negative impact our linear economic model has on the environment (Bebbington et al., 2014).

The need of a different economic model has arisen on the background of price increasing in the raw material market. If we focus our attention in the raw material market for example, we can see that in the last 20 years the price of metals has risen for 170%, rubber by 260% and wood by 115% (Bebbington, 2013).

The current economic model can create difficulties for companies to find raw materials at affordable prices in order for them to generate added value and to maintain economic profitability (Bebbington and Larrinaga, 2014).

Engineering circular eco design

The circular economic business model of production and consumption can force companies to improve their processes, improve their designs, improving supply chains and create an inverted supply chain process in order to reuse the materials contained in their own products (Domil, 2014).

In order to develop a sustainable business plan companies can assess what natural resources they use in the production processes, the quantity and frequency those materials find themselves in the finished product, and what part of the production and distribution process can be improved. This assessment can be compacted in a material flow analysis meant to assist companies in the process of reducing material, energy and water consumption (Draghici et al., 2015).

The material flow analysis can impact design of products expanding the focus beyond raw materials taking into account all environmental impacts of a product throughout its life such as CO_2 emissions, acidification, air pollution, soil and water pollution and hazardous wastes (Gray, 2010).

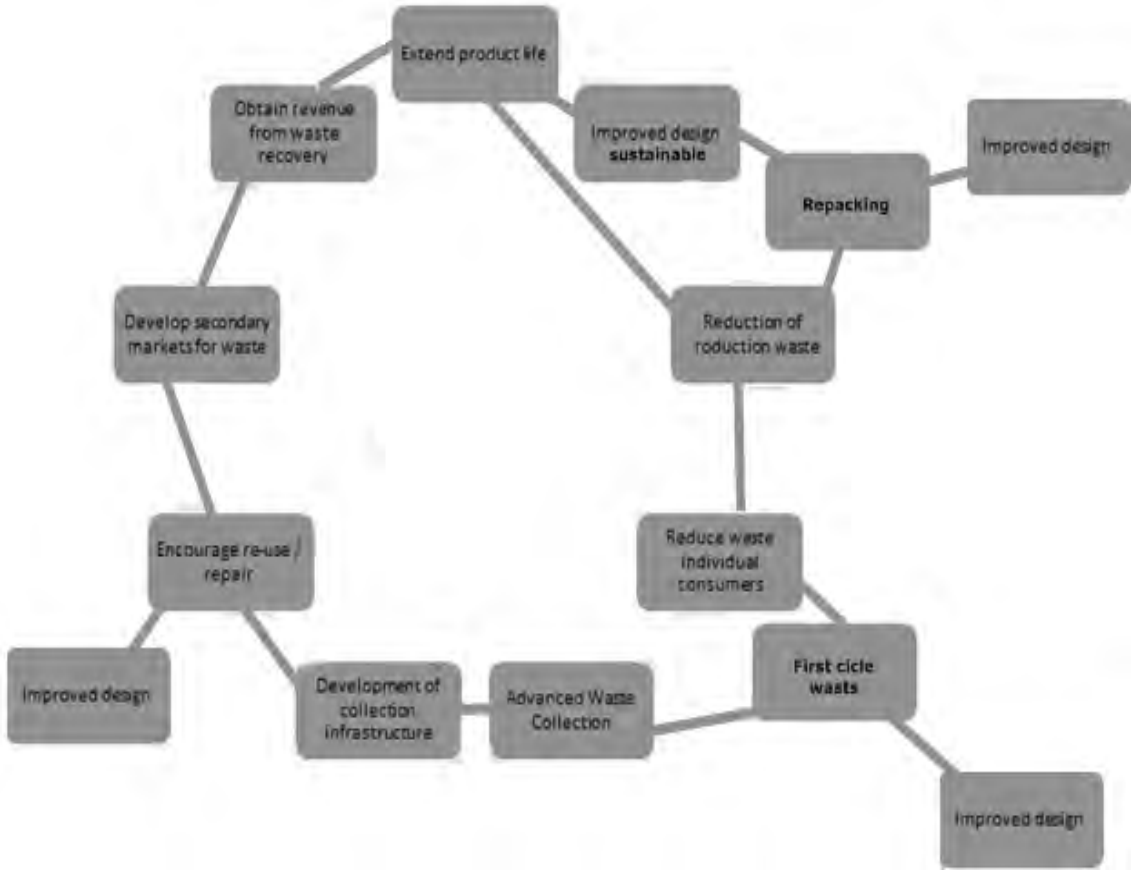

Fig. 1. Adaptation of benefits of reengineered circular eco design

If we focus on the life cycle of a product circular eco design can determine what will become of your product once it's reached the end of its life. Circular eco design can help companies reuse or recycle its products at the end of their life. Determining direct and indirect costs regarding the production and distribution process companies can decrees fix and variable costs and determine the required rate of return for the circular lifecycle of their own products while generating benefits for the environment and for their own year result contained in the balance sheet (Hopwood, 2009; Mateş, et al., 2012; Draghici et al., 2015).

In order to reengineer the distribution proceeds of logistics and reverse logistics to meet the need for eco design, companies need to better control the supply process. Better supply can be achieved through substitutes from recycled sources. For example new plastic can be substituted with recycled plastic; new cellulose paper can be substituted with recycled paper, fossil fuels can be replaced by bio diesel and renewable energy and rare earth minerals and raw materials can be substituted by synthetic materials (Mirza and Holt, 2011; Malsch, 2013; Owen, 2008). Companies when developing public procurement lists can include in the procurement process can include environmental criteria (Ivascu, et al., 2015).

Overview of the impact of circular economy in Romania

The EU economy is currently losing a significant amount of potential secondary raw materials in waste streams. Total EU waste production amounted to about 2.5 billion tonnes. Of this, only a limited percentage (40%) of municipal waste generated in the Union was recycled, the rest being stored in landfills (37%) or incinerated (23%), of which about 500 million tonnes be recycled or otherwise reused. In Romania this percentages are considerable lower. Storage of 100.000 tons of waste creates 12 jobs, while recycling the same amount creates 72 jobs (European Parliament, 2017).

The recyclable waste market in Romania is worth about 1 billion Euros. Of all recyclable waste most economically attractive are paper, plastic, metal and glass. In Romania, about 2-3% of the total municipal waste is currently recycled. We basically waste wasting amounts of raw materials and energy in waste dumps (MADR, 2012).

Romania misses important opportunities to improve the efficient use of resources and create a more circular economy generating growth and jobs, which in turn would reduce greenhouse gas emissions and the Union's dependence on the issues imported raw materials.

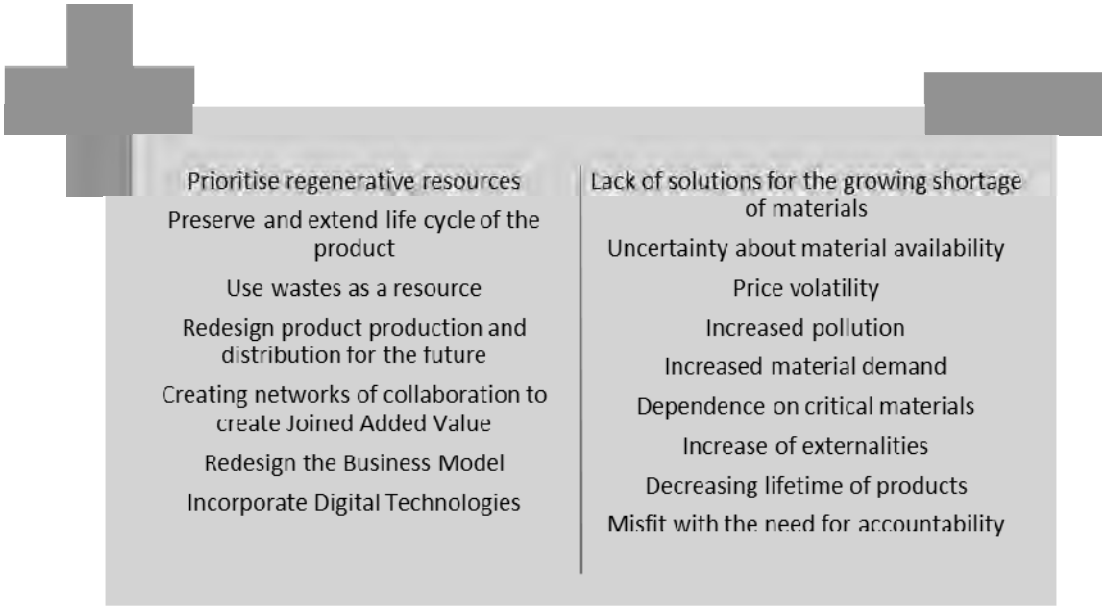

Fig. 2. Strength and weaknesses in Romania from switching to circular eco design

Recycling as much waste requires the installation of the separate collection system at source and the mixing of separately collected waste during transport. In this way, waste-processing units will have

access to high-quality raw materials, not having to import waste to keep their production lines at optimal operating capacities.

Regarding renewable energy sources Romania has produced and exported the largest amount of energy in the last decade, 7.85 TWh of energy from wind, solar or small hydropower plants, 25% more than in the previous year, according to data published by the European Network of Transmission System Operators. In terms of resource efficiency, measured by economic value in GDP generated per kg of primary resources used, Romania is the least performing economy in the European Union. Each kg of primary resources extracted from the natural environment and used in the economy generates an economic value of € 0.34, over 6 times lower than the EU average. Regarding the domestic consumption of resources (measured in tonnes / capita), Romania registered an increase of over 3 times in the period 2000-2014, while the EU average slightly decreased from 16.8 to 13.3 tons / capita. Regarding water productivity, Romania is again in last place in Europe, producing economic value of 10 Euros each m^3 of water extracted from the natural environment (European Commission, 2017).

On the issue of greenhouse gas emissions, an indicator of energy-intensive economy, we are the 23rd country in the Union when they are reported as the economic value unit in GDP (Thomson, 2014), even though we are among the champions of Europe. Regarding waste management, the situation is very worrying, and Romania's chances of achieving the objectives of the legislative package listed above are impossible.

The recycling rate for municipal waste, Romania is Europe's "performer", recycling up to 3% of it, as no other EU country recycles less than 10%. Following the growth rate of domestic resource consumption (314%) and GDP growth rate (192%) over the same period, we are experiencing economic growth away from the principles of the cyclical economy. To increase economic, social and environmental benefits Romanian companies must implement a circular economic business model of production and consumption leading towards an improvement of processes, designs, supply chains and create an inverted supply chain process in order to reuse the materials contained in their own products, Figure 3.

Fig. 3. Adaptation of circular eco design model for Romanian companies

Based on this model of eco design Romanian companies must increase recycling and recycling rates for municipal waste to a minimum of 70%, to increase packaging recycling rate to 60%, to prohibit the storage of recyclable materials such as plastics, metals, glass, paper and cardboard as well as biodegradable waste. Romania must also further promote the development of secondary high-quality raw materials markets, including by assessing the added value of the criteria for establishing the end-of-waste status of certain materials and to clarify the calculation method for recycled materials to ensure a high level of recycling quality.

Cost benefit analysis of circular economy in Romania

Does our paper attempt to share the economic costs and benefits of a circular economy model, in addition to current disposal practices? We have tried to find the net economic effect of certain levels of recycling for each of them waste and compare costs and benefits there are opportunities for net economic benefits from increasing the level of recovery of products that have reached the end of their useful life.

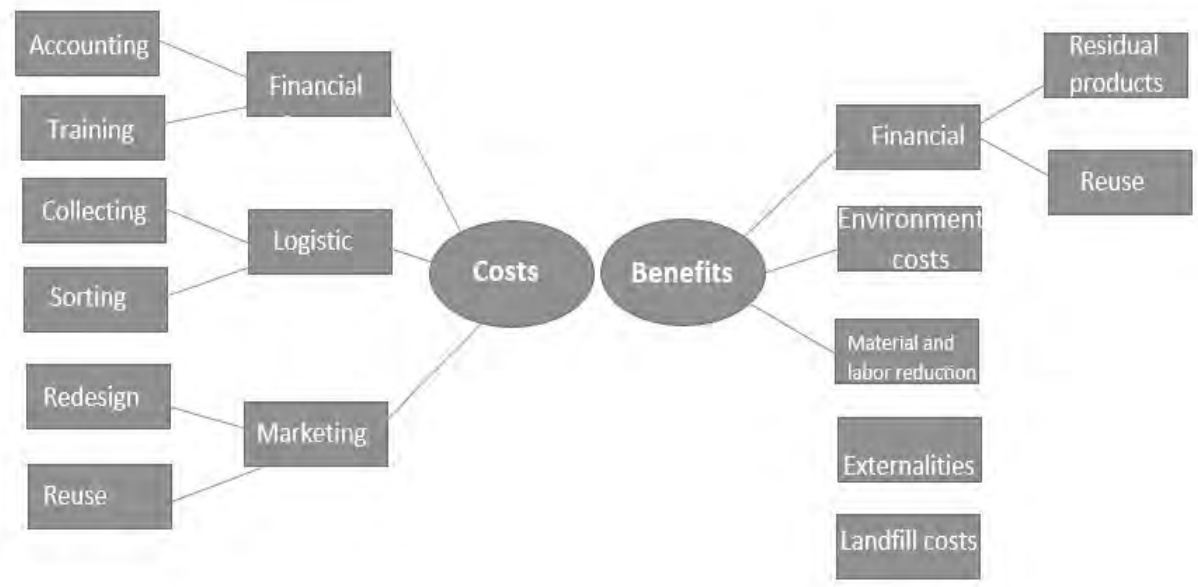

Fig. 4. Cost benefit analysis of circular economy in Romania

In Romania, recycling costs are scaled or estimated from the collection and sorting costs, which excludes the value of materials on the finite market

$$CR = (CC + CS) - VM$$

The analysis for each resource or product uses two sets of hypotheses:

- Early recycling rate based on benefit estimates including savings in garbage costs (using cost estimates at the expense of market rate), eliminating external costs associated with emissions, and direct consumer benefits
- Estimation of reduced benefits using low estimates of the external benefits of recycling or high utilizing high estimates of the external benefits of recycling.

In the case of circular economy in Romania, the recycling costs can be calculated from the costs of re-utilization, service recall plus collection and sorting, which excludes the cost of the reverse logistics system and the value of materials on the secondary and final markets. CR_{EC} =

$$CR = (CR+ RS + CC + CS) – VM_1 –VM_2$$

EU Member States use different methods to determine national recycling rates. In the case of some calculations, it is based on collected or sorted waste, while a considerable proportion of this waste will still be incinerated or stored in common pits, recycled in a low-quality or non-recyclable manner

Conclusions

To increase economic, social and environmental benefits Romanian companies must implement a circular economic business model of production and consumption leading towards an improvement of processes, designs, supply chains and create an inverted supply chain process in order to reuse the materials contained in their own products (Acceleratio Organization, 2018).

Following the growth rate of domestic resource consumption (314%) and GDP growth rate (192%) over the same period, we are experiencing economic growth away from the principles of the cyclical economy.

Romanian must change the process of environmental permits stimulating private initiatives on waste management, an introduction of a waste traceability information system. Romania must develop and maintain active involvement of the producers or economic operators responsible for the education, awareness and involvement component. Turning waste into resources or secondary raw materials is loop closure in systems that promote the circular economy.

Efficient use of resources leads to new growth opportunities, bringing net profits to Romanian businesses. Adjacent measures to increase resource productivity by 30% by 2030 could increase Romania's GDP and could create additional jobs.

References

Bebbington, J., Unerman, J., and O'Dwyer, B.
2014
"Sustainability accounting and accountability", (2nd ed.) Abbingdon: Routledge
Bebbington, J., and Thomson, I.
2013
"Sustainable development, management and accounting: Boundary crossing", Management Accounting Research, 24(4), 277–283.
Bebbington, J., Larrinaga, C.
2014
"Accounting and global climate changes issues", Sustainability accounting and accountability (2nd ed.) Abbingdon: Routledge.
Gray, R.
2010
"Is accounting for sustainability actually accounting for sustainability and how would we know? An exploration of narratives of organizations and the planet", Accounting, Organizations and Society, 35(1), 47–62.
Hopwood, A. G.
2009
"Accounting and the environment. Accounting, Organizations and Society", 34(3–4): 433–439.
Mirza, A., Holt, G.
2011
"Practical implementation Guide and Workbook for IFRS Third Edition Willez Ed.", London
Owen, D.
2008
"Chronicles of wasted time?: A personal reflection on the current state of, and future prospects for, social and environmental accounting research" Accounting, Auditing and Accountability Journal, 21(2): 240–267.
Commission to the European Parliament
2017
Report from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions on the implementation of the Circular Economy Action Plan, Brussels, 26.01.2017

MADR
2012
Raport anual de progrese privind implementarea Programului Naţional de Dezvoltare Rurală în România în anul 2011, MADR
Thomson, I.
2014
Mapping the terrain of sustainability and accounting for sustainability. In J. Bebbington, J. Unerman, & B. O'dwyer (Eds.), Sustainability accounting and accountability (2nd ed.). Abbingdon: Routledge, 15-29.
European Commission
2017
Report from the commission to the European Parliament, the council, the european economic and social committee and the committee of the regions, Available on http://ec.europa.eu/environment/circular-economy/implementation_report.pdf
Acceleratio Organization
2018
Available on http://www.acceleratio.eu/circular-economy/

CONVERGENCE OF LABOUR PRODUCTIVITY INDICATORS, AN IMPORTANT ELEMENT IN PERFORMANCE MANAGEMENT

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Abstract

Purpose – *Innovation on convergence of labour productivity indicator to provide a competitive advantage by promptly and effectively utilizing the human resource, in supporting high performance management.*

Methodology/Approach *- The research of the phenomenon was carried out by a microeconomic, quantitative and qualitative, internal, economic and financial analysis, operating with data gathered during two financial years.*

Findings *– Since labour productivity reflects the efficiency of staff in the work, a correct image of the labour productivity indicator determines the decision making to improve the activity.*

Research limitations/Implications *– The change in prices, the size of the organization and the area in which they operate are factors that influence the measurement of the labour productivity index.*

Practical Implications leaders of organizations *– Increased management performance is facilitated by easier and faster access to updated data and information. The focus on performance management has become a priority for organizational leaders. The authors collected and analyzed information comparing the results obtained in previous periods.*

Originality / value *- Subordinate to performance management, performance measurement is a process that primarily focuses on evaluating performance indicators. Among the most important performance criteria is the productivity of work.*

Key words: *Performance management, labour productivity, human resources*

Introduction

Under the circumstances of fierce competition on both domestic and international markets, all firms have to take action to adapt to new emerging situations. Competitive strategies aim to differentiate the company's position in relation to competitors by generating competitive advantages based on finding effective ways to do so, with a permanent focus on innovation. Effective application of performance management becomes a generator of competitive advantages.

An efficient management requires both a fair and complete information, access to information, and skills to leverage them. Performance management expresses maximizing people's potential to achieve better results, in line with planned goals. In this respect, the paper emphasizes the convergence of the annual, monthly and hourly productivity indicators of labour in order to increase the long-term human resource performance. Achieving improved economic results through performance management is directly linked to an increase in management performance.

Literature review

The main resource within any company is human resource. The main indicator that expresses the efficiency of using the human resource is labour productivity. We have consulted the scientific literature on the original works with theoretical and empirical evidence on management and human resources. Performance appraisal is a component of performance management.

Joseph Schumpeter defined innovation as new goods which do not exist in the market, a new production method, a new market or raw material source, a new field of business, a new financial method or an new organization style. From Schumpeter's definition to today innovation appeared in different forms and was an important factor in economic growth equations. Although it is generally accepted that innovation increases the efficiency and productivity of capital, it can also be said that it increases the productivity of labour force as well (Serdar Kurta, Ünzüle Kurt). RobertoMartino investigates labour productivity dynamics for 1263 regional economies of the European Union during 1991–2007. The decomposition of the growth rate of aggregate labour productivity reveals that pure productivity gains drive growth (2016). Higher wages are associated with lower monitoring, irrespective of whether these high wages are caused by labour market regulations, unions or higher labour demand. We also find that the organization of firms has important macroeconomic implications. Higher levels of average employee trust in managers appear to be positively related to workplace financial performance and labour productivity (Brown, Gray, McHardy, Taylor, 2015). Competition forces businesses to improve the quality of their employees as the intellectual resources which then can led to the achievement of financial performance. Improved financial performance is the result of an ongoing process that involves all stakeholders in a business organization, especially leaders and employees(Saarce Elsye Hatane, 2015). Many contemporary organizations are placing a greater emphasis on their performance management systems as a means of generating higher levels of job performance. Producing performance increments may be best achieved by orienting the performance management system to promote employee engagement (Gruman, Saks). The literature on corporate social responsibility reporting is well-established. However, issues related to employees' work environment have been consistently overlooked. Work environment issues refer to all aspects of the design and management of the work system that affect employees' interactions with the workplace. The lack of attention on work environment is problematic given its influence on worker health and organizational performance. Enhanced reporting on work environment issues could motivate companies to make meaningful improvements in this area (Searchy, Dixon, Neumann, 2016). Although the construction labour productivity frontier has attracted much research effort, the temporal and regional characteristics have not yet been explored (Ma, Liu, Mills, 2016). Finally, update of the labour productivity indicator was a stringent necessity in conditions of economic crisis, to streamline management decisions and improve financial results (Lang, Brad, 2016).

Companies need to be able to adapt to changing business environment. As the variations in the economic environment are not predictable, and the changes are fast, the need to adapt firms to the rapid changes of the markets imposed by the context of globalization is a process of continuous training and innovation. The ability to adapt to the ongoing changes that occur, makes the difference between the survival and the success of an organization. This aspect makes "performance" a concept that is widely used in any business. Labour productivity is one of the most important synthetic indicators of business efficiency. We analyzed the information from the literature in correlation with the current research objectives. The review of empirical research shows that the adoption of a performance management is limited by the existence of inadequate information support to the complexity of the current economy. The updating of the information regarding the annual productivity of the work being carried out (Lang, Brad, 2016). Through this paper we aim to update the productivity indicators of the hourly and monthly labour, in order to achieve the convergence of the results expressed by them.

Intangible staff vs. virtual staff

We propose to analyze the notion of intangible staff in the desire not to create confusion. To this end, we analyzed the notion of invaluable capital, human capital and human resource.

Intangible capital. Human Capital. Human resource

We shall explain the differences between these three notions. What is intangible capital? A company's capital can be both intangible capital and physical capital. If a firm invests in the education of its employees, it invests in producing intangible capital as the human capital. The intangibility of human capital is evident from the definition. Adam Smith (1962) is the one who has defined human capital as the sum of abilities, dexterity (physical, intellectual, psychological, etc.) and judgment.

Human capital is defined as “the knowledge, skills, competencies and attributes embodied in individuals that facilitate the creation of personal, social and economic well-being.”(OECD,2001, p.29).

In conclusion, we look at human capital through education and human resources as a labour resource. The distinction in this way of human capital towards the human resource determines us to propose the change of the name of intangible personnel (or intangible staff) in virtual staff. The reason is that intangible staff has been defined as a labour resource. In order not to create confusion, we propose changing the name of intangible staff to virtual staff.

Labour productivity

Productivity per employee (annual labour productivity)

Innovation of the annual labour productivity indicator was done from two organizations that have the same output, operating income, turnover or value added compared to the same average number of employees, taking into account different features of the work program (Lang, Brad, 2016).

To highlight the need to correct the definition of the productivity indicator, we will consider two entities A and B, with the same average number of employees and producing the same output, having the same operating income or added value. In the first case, in order to achieve the output of the exercise, operating income, turnover or value added, employees need 10,000 hours, while in the second case they need 100,000 hours. It is obvious that the annual labour productivity (per employee) is different. According to the currently used formula, annual labour productivity (per employee) is equal.

If an employee works 1 day to make a piece and another works for 2 days for the same piece, it is obvious that the first is preferred. The current form of the work productivity formula per employee results in the same value.

In $NOML_e^q$ we quantified both hours worked during normal work q hours a day and night overtime, weekend and public holidays where there was performed work turned in legal work time of q hours a day. We defined the EXTENDED number of work hours worked within the legal work time q hours a day, as the sum of all hours worked by the personnel of the company considering that for the calculation of hours worked during the legal work time and the application of corresponding percentage increases according to the law (Lang, Brad, 2016):

$$NOML_e^q = t^L + \sum_{i=1}^{k} t_i^S * \left(1 + \frac{p_i}{100}\right) + \sum_{i=1}^{l} t_i^N * \left(1 + \frac{p_i}{100}\right) + \sum_{i=1}^{m} t_i^W * \left(1 + \frac{p_i}{100}\right) + \sum_{i=1}^{n} t_i^{Sa} * \left(\frac{p_i}{100}\right)$$

where

t^L represent the work hours worked during the normal work time;

t_i^S represents the overtime worked in relation to a salary percentage increase equal to p_i ;

k represents the type of aovertime whereupon there is applied a salary increase percentage;

t_i^N represents the night overtime worked in relation to a percentage of salary increase of p_i ;

l represents the type of night hours worked whereupon it is applied a salary increase percentage;

t_i^W represents the number of hours worked during the weekend related to a percentage of salary increase equal to p_i ;

m represents the type of hours worked during the weekend whereupon there is applied a salary increase percentage;

t_i^{Sa} represents the number of hours worked during the legal holidays related to a percentage increase equal to p_i ;

n represents the number of hours worked during the legal holidays whereupon there is applied a salary increase percentage;

The total extended personnel number in relation to a legal work time of 8 hours per day becomes (in 2018):

$$P_e^8 = \frac{NOML_e^q}{2000} \frac{hours}{\frac{hours}{employee}} = \frac{NOML_e^q}{2000} \text{ employees}$$

The calculation formula of the total number of extended personnel:

$$P_t^e = \sum_{t=1}^{n} P_t^t$$

where

P_t^e represents the average number of total extended personnel resulting from the calculation and having divisions with different work hours per day;

P_t^t represents the average number of the total extended personnel resulting from the calculation in case of a legal work hour of I hours;

It is possible to calculate the number of virtual staff (VS) as it follows:

$$P_{VS}^q = P_t^q - P_A^q$$

where

P_{VS}^q represents the average number of the virtual staff with a work time duration of q hours per day;

P_t^q represents the average number of the total extended personnel resulting from calculation in case of a legal work time of q hours;

P_A^q represents the average number of employed personnel, with a worktime duration of q hours per day.

Another way of expressing the number of virtual staff is:

$$P_{VS} = P_t - P_A$$

where

P_{VS} represents the average number of virtual staff of the company

P_t represents the average number of total extended personnel of the company resulting from the calculation

P_A represents the medium number of the company's employees

The formula of the extended annual labour productivity, noted W_a^e, becomes:

$$W_a^e = \frac{T_{output}}{P_t}$$

where T_{output} represents Total output (the output of the exercise, operating income, turnover or value added), or expressed according to the medium number of the virtual staff, is:

$$W_a^e = \frac{T_{output}}{P_A + P_{VS}}$$

Productivity indicators and the importance of competitive advantage

The notion of "competitive advantage" was defined by Michael Porter. According to M. Porter's conception, competitive advantage may be either obtaining a low cost of products or services or differentiating them (M., Porter, 1990, p. 38).

If employee A works 1 day to make a play, and employee B is working for 3 days for the same piece, it is obvious that the first is preferred. The current form of the work productivity formula per employee results in the same value, which is false. In reality, employee A has a competitive advantage over employee B.

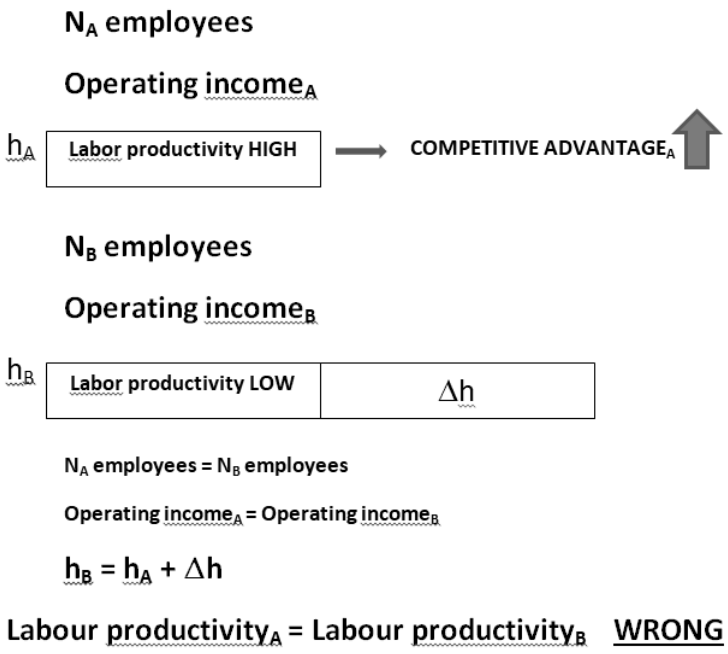

Figure 1. Wrong labour productivity indicator requires updatig

Increasing company performance requires observing the correlation between work performance and average wage average. Labour productivity is a qualitative factor, and human resources as a quantitative factor. We take the following example: To make a piece, employee B will work with Δh more time to accomplish the piece than employee A. It means that employee B will cost me more. We note that productivity growth is an increase in production, and a decrease in labour costs.

One of the aspects of competitiveness advantage, the scientific organization of work, is a basic attribute of management. Decisions on human resources being of major importance to any company, the information underlying the decision must be as accurate and complete as possible. A performance management does not use erroneous information.

Hourly labour productivity

The formula of the hourly labour productivity, noted W_h^r :

$$W_h^r = \frac{T_{output}}{Total\ productive\ hours}$$

where T_{output} represents Total output (the output of the exercise, operating income, turnover or value added)

We define the formula of the extended hourly labour productivity, noted W_h^e, and becomes:

$$W_h^e = \frac{T_{output}}{NOML_q^q}$$

where T_{output} represents Total output, and $NOML_q^q$ represents EXTENDED number of work hours worked within the legal work time q hours a day.

Management performance is the most important process in terms of human resources. Management performance should restore a fair scale of human resource values, the scale used to motivate

employees to achieve their performance. We say that it MUST, because in reality the use of outdated tools, disadvantages both the human resource and the whole company. In this situation, one cannot focus on the competitive advantage, but on the effort to minimize a competitive disadvantage that can be decided even to survive the firm.

To avoid these issues, the current research emphasizes the use of accurate and complete information. In this sense, we believe that all information used by a firm needs to be checked and updated. We aim to achieve the convergence of the annual labour productivity indicator (per employee) and the productivity and labour indicator.

For this purpose, the definition of the total number of hours converted into hours worked during normal labour is used. In this way, obtaining the equality of a result obtained by calculating the annual labour productivity index, respectively the productivity or labour indicator.

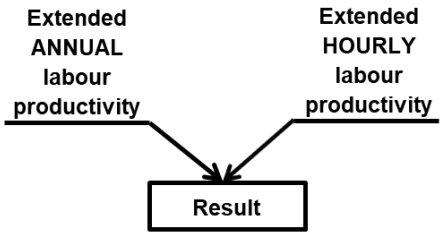

Figure 2. Convergence of labour productivity indicators

Discussion and conclusions

The need for continuous growth of the performances of the organization, focusing on performance management correlated with managerial strategy, has led us to analyze the shortcomings of the labour productivity indicator in its current form. Strategies to achieve goals can only be achieved with the optimal use of human resources. Performance measurement is a continuous process, the results being used to the analysis of achievements, the correction of some decisions in order to increase the efficiency of the operations. These aspects determined us to analyze the variables that influence labour productivity, its implications in the current form, respectively a redefinition of this indicator.

This scientific paper is a continuation of the previous paper (Lang, Brad, 2016). Redefining the hourly productivity indicator is done by using the notion of "intangible staff" as defined above, with the statement that we are making a change in this regard. In order not to confuse this notion with elements of intangible capital, we proposed to change the notion of "intangible staff" to "virtual staff".

By redefining the productivity indicators of annual, monthly and hourly work, we have achieved the convergence of the mode of expression. We eliminated the weak points that negatively influenced the performance measurement of the organization from the point of view of the labour productivity, respectively from the point of view of the decisional system, which had unwanted effects on the obtained results.

NOTES

Knowledge has become a very important resource. Mostly, it is considered that a company's lack of performance is due to its employees. The continuous preparation of human resources has become a necessity for increasing labour productivity. Performance management has the role of increasing productivity. Performance management, in addition to the process of evaluating past activity results, requires making decisions to improve results, to develop and consolidate the long-term business. Performance measurement is vital to improving decision-making, namely increasing management performances.

References

Serdar Kurta, Ünzüle Kurt
2015
“Innovation and Labour Productivity in BRICS Countries: Panel Causality and Co-integration”, Procedia - Social and Behavioral Sciences 195 (2015), 1295 – 1302
Roberto Martino
2015
“Convergence and growth. Labour productivity dynamics in the European Union”, Journal of Macroeconomics, Volume 46, December 2015, 186-200
Daron Acemoglu, Andrew F. Newman
2002
“The labor market and corporate structure”, European Economic Review, Volume 46, Issue 10, December 2002, 1733-1756
Sarah Brown, Daniel Gray, Jolian McHardy, Karl Taylor
2015
“Employee trust and workplace performance”, Journal of Economic Behavior & Organization, Volume 116, August 2015, 361-378
Saarce Elsye Hatane
2015
“Employee Satisfaction and Performance as Intervening Variables of Learning Organization on Financial Performance”, Procedia - Social and Behavioral Sciences, Volume 211, 25 November 2015, 619-628
Jamie A.Gruman, Alan M.Saks
2011
“Performance management and employee engagement”, Human Resource Management Review, Volume 21, Issue 2, June 2011, 123-136
Cory Searcy, Shane M.Dixon, W. Patrick Neumann
2016
“The use of work environment performance indicators in corporate social responsibility reporting”, Journal of Cleaner Production, Volume 112, Part 4, 20 January 2016, 2907-2921
Le Ma, Chunlu Liu, Anthony Mills
2016
"Construction labor productivity convergence: a conditional frontier approach", Engineering, Construction and Architectural Management, Vol. 23 Issue: 3, 283-301
Cristian Carol Lang, Stelian Brad
2016
“The pressure of economic crises upon the necessity of redefining the labout productivity indicator”, Proceedings of the 5th Review of Management and Economic Engineering International Management Conference From Management of Crisis to Management in a Time of Crisis, 2016, 339-346
Smith Adam
1962
The wealth of nations. Research on nature and its causes, vol. I, Editura Academiei Romane, Bucuresti 1962
OECD
2001
“Human Capital” - OECD.org, https://www.oecd.org/insights/37967294.pdf

FISCAL MANAGEMENT FROM THE PERSPECTIVE OF PRACTICAL APPROACHING OF FISCAL EQUITY

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Abstract

Purpose *– Even from the beginning of public finance sciences, the economists have been preoccupied with finding the "philosopher's stone" of the taxation: maximum resources with minimum costs; both parts of the equation must be in concordance with the level of fiscal pressure that can be tolerated by the taxpayers.*

Methodology/approach *- On a certain moment, with similar conditions, the relation between the state public resources and the taxpayers' incomes presents at least two situations: for the state - maximum of revenues and for the taxpayers – higher tax rate.*

Findings *– In Romania, the fiscal equality, (not fiscal equity) is guarantied by the Constitution: "the legal system of taxation should ascertain the fair assignation of the fiscal debts". By fair we can understand also equitable but not only..*

Research limitations/implications *– In order to diminish the perception of inequity, one of the viable solution would be the elaboration of a multi-annual fiscal strategy.*

Practical implications *– The conflict between the general interest – the collection of a maximum of revenues for state- and the private interest – to keep for the taxpayer the highest possibly amount of their revenues,- represents more or less the perception of equity or inequity.*

Originality/value *– As a rule, the general interest complies with the priorities established by government's political programmes, and the individual interest is connected with the individual's ability to satisfy his needs, with the net revenues he owns after taxes.*

Key words: *fiscal management; fiscal equity; fiscal system.*

Introduction

The requirements of fiscal management should be synthesized and approached from two ways: a) correlation between the procedures and mechanism of public resources collecting on a side, and economy reality on the other side b) efficiency and optimum of collected resources allocation.

The sequence of fiscal management efficiency and performance purposes follows the natural logic of the budget process: 1. detecting the economy capability to generate resources; 2. quantification of the minimum and opportune needs; 3. identification of the sources to cover the needs, in accordance with the power of economy to generate this resources; 4. determining the mechanism of revenues collecting; 5. resources allocation opposite with the needs previously quantified; 6. control of resources consumption compared with the desired efficiency.

Regardless of the historical period, the political orientation or the level of the economic development, the management of budget process needs efficiency and performance.

The phase when the collecting mechanisms are assigned and applied have the biggest impact on the players (taxpayers and state), mechanism that has to comply with the requests of equity, generality, universality and efficaciousness. Therefore, the fiscal management actions, especially of the Ministry of Public Finance, must comply with the goal of any type of management: efficiency and performance.

On a certain moment, with similar conditions, the relation between the state public resources and the taxpayers' incomes presents at least two situations:

- for the state - maximum of revenues means more collected tax which allows higher public expenditures while fulfilling the governance policies;
- for the taxpayers – higher tax rate means smaller net incomes, having an impact on the standard of living.

The solution of this equation is the key of fiscal management efficiency turning real: economical and social growing or recession, prosperity or pauperization of people, a nice climate or tensions inside of the social relations, evolution or stagnation of external relations, etc.

The fiscal equity – principle of tax collection accomplish

In Romania according to the law (Art. 3 Law no. 571/2003 concernign the Fiscal Code), the principles of assigning the level of fiscal collections are as follows:

a) the neutrality of fiscal measures in relation with different categories of investors and capitals;
b) the certitude of taxation, by issuing norms that don't allow interpretations;
c) the fiscal equity getting to the level of physical persons, by distinct taxation of incomes, in accordance with the dimension of the revenue;
d) the efficiency of taxation by ascertaining a long term stability of the fiscal laws.

From all the fiscal principles that refers to fortune and/or revenues taxation, the fiscal equity has generated the most controversial opinions and tax theories. Why? Because it is easy to declare and report on maximum of equity during the political speeches, without any practical restriction of fiscal policies. Even if the fiscal equity requires its actual presence and real action each time when the tax system or the tax quotation adjustments are modified, in fact, the fiscal equity remains a notable absence. The equity must be present and active each time when taxation touches the personal income of people, but it is lost during the collecting of the fiscal system.

The equity is:

- for the taxpayers – complying with the individuals payment ability when they have to endure a tax rate, meaning not to oppress the taxpayer with a fiscal obligation higher than his real possibilities. Certainly, assigning a fiscal obligation based on the equity principle helps the taxpayer to have a minimum income for a decent life and civilized way of living.
- for the stat – putting into the practice the principle of equity requests an adequate system of deductibility, carried out by the fiscal administration. This system means the levelling of the physical person incomes, before the tax rate settlement, with respect to the financial power and the endurance of the taxpayers in relation with the fiscal pressure.

We have to mention that, in Romania, it has been paid a big attention to the fiscal equity:

1. Constitution - as a fundamental principle of relation between state and citizens, concerning the taxation;
2. Fiscal Code – as a principle of elaboration and institution of fiscal norms;
3. The Law of public finance – as a principle of assigning and applying the fiscal mechanism;
4. Theoretical approaches of taxation – as a fiscal means and procedure.

Practically, every study related to taxation allocated a large number of pages to the equity principle. In the fiscal field, the equity is desired, enacted, but …. not yet applied.

The fiscal equity – between the interests and way to the efficiency

Not only Romania is tributary to the fiscal efficiency, at any price. The developed countries have the same problem, the differences between them, concerning the fiscal system approaching, are done by:

- the fiscal relation between the state and citizens;

- the taxation approaching principles;
- the fiscal system way of structuring;
- the predictability of fiscal laws;
- the rigorous applying of fiscal law;
- the way the fiscal principles are honoured.

For each point herewith, the emerging economies, especially the East European ones, are recording deficits compared with the countries where the market economy principle is fully working, theoretically and practically, in the same time. The developed countries proved that a fiscal system can generate a high efficiency and general performance, while the fiscal equity is at a high level. The East European countries, including Romania, are tributary to the low fiscal efficiency and to the lack of performance on the tax field, in the circumstances of a high fiscal inequity.

In Romania, the fiscal efficiency has an unfair „competition" with the principle of fiscal equity: revenues at any price. Such a sequential approach of taxation, exclusively emphasizing the fiscal efficiency, to the detriment of systemic approaching, leads to the medium and long term failing of the entire system, and eventually to a difficult to repair non-efficiency.

Certainly, with this fiscal philosophy orientation – efficaciousness before the systemic efficiency - those who are losing are first, the taxpayers which have a reduced endurance, and second, the state. Even if the state is the game ruler, it will be trapped in its own snare, recording a medium and long term non-efficiency.

The fiscal equity – between the conception about state and citizens acceptance

Certainly, the tax needing is associated with the theories about state, as a result of the social contract (state-citizens): the state right of tax setting is recognized by the citizens by the „social contract" itself, which arises the state. The right of tax setting, just as a result of the social contract cannot be naturally accepted without any argumentation. The supreme purpose of the taxes is to create the public resources designated to ascertain the existence and functionality of state itself. Therefore, the state needs resources, first for existence and operation, as an abstract entity. Only on the second hand it has the function to supply the social security to the citizens.

The practice has proved us that the biggest part of collected resources by taxation it is being used for state existence and operation, which is the institution the state has created. If the citizens need the state, or not , this is another controversial dilemma, which could be the subject of another study.

The public finance doctrine accredits, among other things, two theories meaning to justify the taxes necessity: the theory of equivalence and the financial theory.

The theory of equivalence supposes a certain accord and causality between the tax rate paid and the services supplied by the state, for the advantage of its own citizens, and the financial theory refers to redistributing of incomes within the economy, which is the financial leverage role of taxes.

The tax rate are compulsory, non-refundable, with no returns and non-personalized in relation with the taxpayers and beneficiary of social security services.

The fiscal equity is not a theory about finances: the fiscal equity is a fundamental principle, a norm, a law of the fiscal system operating, successfully used and verified within the fiscal practice of the last 200 years.

The equity principle has the function of levelling the taxable base before taxation, and the role to ascertain the balance, sometimes fragile, between the fiscal pressure- the state force that is pressing the citizens by taxation- and the taxpayers level of endurance. There are many situations when the fiscal equity is considered an abstract principle. Such a way of thinking shows that the officials, that are representing the citizens activate against the "dutiful" people, often hurting their existence by harming their standard of living. How? reducing their incomes by taxation, more than their real possibilities.

The fiscal equity – approaching criterions

In order to ascertain a minimum of fiscal equity, the debts of taxpayers should be assigned based on some criterions, as follows:

a) reciprocity: the taxpayers are paying tax and rates and the state must offer them a quantity of proper services, those services that are part of state functions. This criterion can be easily express in theory, but in fiscal practice field it is more difficult to find it, due to the different needs of individuals;
b) reciprocal respect : if the taxpayers comply with the rules stipulated by the law and they pay their debts, also the state should have the same attitude when supplying the services to the citizens;
c) effective mending : the taxpayers who fail to pay their debts to be punished (penalties, fines, even penal sanctions). When the state doesn't accomplish its obligations it should abide the same sanctions.
d) relations between equals : within the process of budget income composing and during the stage of distribution, the taxpayers and the state should be equal partners, meaning that each one should honour its obligations.

It is debatable the real existence of these criterion inside of the fiscal systems. The desideratum are just some theoretical conditions, the fiscal specialists consider that they are necessary but not enough, in order to ascertain the fiscal equity.

The criterion above-mentioned should be completed with the condition which is defining the fiscal equity: the ability-to-pay of each taxpayer to accomplish the debt assessed by state, according to the law. Only in this way the fiscal equity can be ascertained within the process of tax collection.

The tax settlement and collecting in accordance with the ability-to-pay is conditioned by the taxation configuration:

- fix amount or
- tax quotes.

The citizen's ability-to-pay taxes, rates, tolls or contributions, generally named tax rates, in relation with the size of property or incomes, is considered to have an essential importance by Adam Smith, (1962) who wrote about the tax maxims: „the subjects of every state ought to contribute towards the support of the government, as nearly as possible, in proportion with their respective abilities,; that is in proportion to the revenue which they respectively enjoy under the protection of the state".

The fiscal equity – implementation condition

Considered by Adam Smith (1962) as an essential principle (a maxim) for a proper fiscal system, the fiscal equity is desired not only from the perspective of the taxation justice ascertaining, but also from a practical reason.

The pragmatism is a consequence of the fact that an unjust fiscal system generates the taxpayers' opposition, which eventually materializes as an increasing of tax avoidance phenomenon. Pursuing with the same reasoning, the taxpayers long time dissatisfactions' accumulation, can generate a negative reaction to the political power, even the government dismissing. Because the political officials do not formulate a fiscal policy based on the fiscal equity criterions.

In order to accomplish the purpose of the fiscal equity, a number of conditions should be fulfilled., as follows:

1. assign a minim tax-free income, in the same time with some exemptions and tax reductions settlement, designated to satisfy a decent life requirement;
2. general application of tax debts so these can affect the all social categories which are "producing" incomes from the same source or which have the same kind of property;

3. the assignation of the fiscal debt according with the fiscal equity, a condition which requires a differentiation of the fiscal burden from a individual to another, varying with the taxable base and also with the personal status;
4. for the same ability-to-pay, the fiscal burden should be similar for all physical persons, independent of the organization structure or the property type (state or private).

All these conditions required to accomplish the goals of the fiscal equity principle, are attributes of the fiscal policies, which are generated by a legislative system.

Therefore, the connection between the fiscal equity and the legislative system is a kind of dependence between the fiscal equity and the concept (philosophy), which are the basement of the fiscal policies followed by the fiscal regulations.

In Romania, the fiscal equality, (not fiscal equity) is guarantied by the Constitution: “the legal system of taxation should ascertain the fair assignation of the fiscal debts”. By fair we can understand also equitable but not only.

The equity – an attribute of the fiscal management

The principle of fiscal equity should be present and active during the fiscal policies conceiving, then it becomes real at the fiscal regulation norms elaboration; it actions as a “guide” for the orientation of the fiscal leverage, for the means and procedures used during the stage of tax assignation and tax collecting.

The management performance, within the process of public resources collection, depends on the material consideration of the fiscal equity concept.

The main leverage that the government (the executive power) owns and uses in order to promote the fiscal equity, is represented by the fiscal-legislative system. The promoter of taxation is the Ministry of Public Finance in accordance with the governmental policies during a certain period. Therefore, this authority represents the constructor and the administrator of the system; the way it builds the system is the way it will function. The system’s performance depends on a) the manager - constructor and b) the manager - administrator.

The practical application of the equity principle requires to find and assign the etalon which can measure the ability-to-pay; also requires a norm that distributes the fiscal burden in accordance with the etalon.

The ability-to-pay assessment can be made using some indicator like: the revenue, the property, the consume, the age, the social status, geographical area, etc. During the history, there has never been such a social-state organizational system which can ascertain for the citizens a life based on a perfect economical, social or fiscal equity. This is because, the equity is a ethical principle which will always have a certain grade of subjectivism, varying with the interpretation of the people involved in a process: economical, social or fiscal. The actors of this process are mainly the state and the taxpayers.

From the fiscal point of view, even the legal obligation (!) to pay taxes to the state generates an experience of inequity, compared with the potential or effective benefits received as a result of the contribution.

The conflict between the general interest – the collection of a maximum of revenues for state- and the private interest – to keep for the taxpayer the highest possibly amount of their revenues,- represents more or less the perception of equity or inequity.

As a rule, the general interest complies with the priorities established by government’s political programmes, and the individual interest is connected with the individual’s ability to satisfy his needs, with the net revenues he owns after taxes. The inequity perception, as a part of taxation appears when the taxpayers earn small revenues, when there are not varied tax rates, or when taxpayers with the similar revenues endure different tax burdens

Discussion and conclusions

1. The State, this „abstract being", administrates the citizens' needs related to some groups interests, groups that the state is representing in a certain moment. The taxpayer citizen will always administrate his revenues in a more appropriate way than the state can do. There is no question about the tax rates role and importance, it is only about tax dimension and the way the money is used and the way they affect the citizens. The state should leave to the citizens a higher percentage of their revenues, by taking off the "scissors" of that part of the revenue which can ascertain to the individual his social self-protection: more money left to taxpayer, less bureaucracy and administration costs, more efficiency of public money spending and a general reduction of the social expenditures.
2. The democracy allows the political groups, which are, at least theoretically, representing a part of the citizens, to govern a country, while the other part of people has to comply with the decisions taken by leaders which are not their representatives. The alternation of the political groups as government, another characteristic of the democracy, reverses the situation, so the other part of society experiences the fiscal inequity.

In order to diminish the perception of inequity, one of the viable solution would be the elaboration of a multi-annual fiscal strategy, which can express at least the following:

a) the state resources assigning process conception, taking into account the fiscal equity principle;
b) resources reallocation on principles of optimality and performance.

3. The social protection means are more complicated than efficient: bureaucracy, tortuous financial circuit, subjective social analyses and investigations, and more that everything, great social security administration costs compared with the effects. All these deficiencies lead to inefficiency and inequity: even if a citizen paid higher tax rates, his benefits will not reach his expectations. The fiscal management efficiency is delayed by the lack of strategies, the system's bureaucracy, the group interests, corruption and lack of professionalism, both in the stage of tax collection (excessive fiscal evasion) and in that of resources allocation (public investments and acquisitions, discretionary social assistance, etc.).

References

Bîrle, V.
2006
"The fiscal equity", Teora Publisher, Bucharest
Brachet, B.
1979
"Manuel de droit fiscal", Paris
Dobrotă, N.,
1999
"Dictionary of Economics", Economică Publisher, Bucharest,
Dunăreanu, A., I.,
2005
"Justice, judger management" All Beck Publisher, Bucharest
Jamevic, P., J.,
1991
Les Paradis fiscaux, Revue française publiques, nr. 33;
Jéze, G.,
1922
"Cours de science des finances et de législation financiére française", Paris,
Kahn, P.
2006
"The Philosophy from A to Z", ALL Educational Publisher, Bucharest.
Kegley, C., jr.,
1999
"World Politics Trend and transformation" St. Martin'Press, New York,

Michel, D.
1994
" The economy and the rules of the game", Humanitas Publisher, Bucharest
Nozick, R.,
1974
"Anarchy, state and utopia", Humanitas Publisher, Bucharest;
Smith, A.,
1965
"*The Wealth of Nations", Romania Academy Publisher, Bucharest*
Şaguna, D. D.,
2003
"Financial and fiscal Law" , All Beck Publisher, Bucharest
Vechio, del, G.,
2005
"*Juridical philosophy lessons", Europa Nova Publisher, Bucharest*
Wagner, A.,
1908
"Traité de la Science des Frances", Paris

THE RELATIONSHIP BETWEEN THE EXPERIENCE OF PARENTLESS AND THE FUNCTIONING OF ADOLESCENTS, AND THE CONNECTION TO RISK BEHAVIORS

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Abstract

Purpose *– to find out the adaptation of the adolescents in school, middle school age, after the loss of one parent, while emphasizing the extent of post-mourning adaptation.*

Methodology/approach *– distributing a management styles an adaptation questionnaire for schools and interviews, analyzing the data using a statistical tool SPSS.*

Findings *– there are differences in the level of school adaptation between adolescent's boys and adolescents' girls after the mourning of one of the parents suggests that there are differences between both sexes, so that the level of school adaptation among adolescents' girls is higher than the level of school adaptation among adolescents' boys.*

Practical implications *– it is important to emphasize that the more knowledge and willingness the teacher has to deal with these subjects, the more effective it will be in helping his students. and in order for the teacher to assist the student in a crisis situation, he or she needs assistance from another professional factor in the school or community.*

Research limitations *– we should to examining the status of the teacher; one can discern the potential of providing crisis support: The teacher is a familiar figure to a student who usually knows him even before the crisis. The teacher is an adult figure, who sometimes replaces the parent, so the student has a willingness to contact him.*

Originality/value *– The way the child treats his loss and the emotional well-being he receives from those around him will have a decisive influence on his character and approach to life (Raviv, 1975).*

Key words*: Loss, Parent Loss, Loss process models*

Introduction

The loss of a parent in adolescence requires the adolescent to cope cognitively, emotionally and emotionally with five main dimensions: trust in the ability to observe events, acquire a sense of control, create a relationship characterized by belonging, belief that the world is right and appropriate (Layne et al. 2008).

The Ministry of Education in the State of Israel does not take responsibility for adolescents who experience the loss of one of the parents, and does not provide them with a thorough treatment of the trauma they experienced. According to the Psychological Counseling Service (Consulting Division), Counseling for students as individuals is designed to help them cope with difficulties (temporary or ongoing) in their various areas of life: Initial detection and identification of the problem, short-term intervention (if necessary), concentration of information and coordination between the various factors related to the problem, and referral if necessary. Although most children experience parent's death, a period of mourning that is considered "normal" or "typical" will occur, which will include emotions such as sadness, longing, fear ... in varying intensity and frequency over a long period of time (Cohen, J& Mannarino, 2011).

The Ministry of Education did not establish a treatment policy for traumatized students. The loss of one of the parents within the school, but it is preferred that the student be referred to the welfare services or the school psychologist whose training is not in the clinical field, which can help the affected student. This is why we will examine the effect of loss on adolescents in the field of self-adaptation.

This study may help the school's educators and counselors to take care of and help students who have experienced the loss of one of the parents in the best and most beneficial way to the student.

Loss

The death of a close person is a difficult experience that shakes the world of the individual at mental, cognitive, social, and perhaps physical levels. Alongside this is a universal human phenomenon that some mature people in their lives experience the process of mourning, which begins with the knowledge of the death, is often long, painful and intense and its possible end is a renewed adaptation to life without the deceased and reaching a renewed balance (Cohen & Mannarino, 2011).

Parent Loss

Since parents have a central role to play in the development of a child and in a person's life over the years, his death has multidimensional implications that often undermine the orphan's life, at least temporarily. From attachment theory, the strong relationship between the parent and the child is based on psychological and social needs that require a strong bond between a child and his parents (Granat, 2014).

Aline (2012) notes that the emotional connection between parents to a child develops and changes throughout the process of growing up. This relationship provides, for both the child and for the parent, many complex emotions and is a dynamic and changing relationship, moving between getting closer and moving away over time. When a parent dies, the balance that exists in such a unique system is grossly violated, resources are required and the child is reassessed to rebuild his or her life without the parent's living partner (Allen, 2012).

Loss process models

The process of mourning is an emotional, cognitive, continuous, dynamic and interactive process, which involves the dissolution and construction of the internal representations of the deceased and the relationship with him. This process develops and changes over time and it affects and is affected by the social context and life events (Silverman & Klass, 1996).

Bowlby’s attachment theory

Bowlby (1982) dealt with attachment and saw the phenomenon of mourning as an attempt to maintain contact with the lost figure, rather than an attempt at detachment. He emphasized the importance of human development in general and coping with the state of separation in particular, and did so within the object relations school, which focuses on the ongoing relationship of people with introverted representations of significant others. The contact changes the shape due to loss. This theory, Rubin stresses (1993), sharpened the understanding of the need for humans to be close to significant and protective figures in physical reality on the one hand, and to the internalized representations of those characters. In children, the need to be close to motherhood is vital to their physical existence, and to adults, the need to be close to meaningful characters undergoes transformation when the representations of the characters become mental, psychic. Therefore, when a person finds himself in a state of loss, he feels the need to approach the deceased himself, among other things the need to approach his introverted representation.

The expressions of mourning

Of all the challenges of life, dealing with grief requires stamina and patience. After the loss of suffering, it is almost impossible to bear the thought that the process may take a long time. However, the path to recovery requires coping with the entire mourning experience (Aviad, 2010). Loss in adolescence requires the adolescent to cope cognitively, behaviorally and emotionally with five central dimensions: trust in the ability to observe events, acquire a sense of control, and create a relationship

characterized by belonging, belief that the world is just and fair. Adolescents are preoccupied with questions of identity, examining themselves and the environment, and are both in a state of immaturity and in a developmental state in which every event can be critical in shaping identity, shaping their personalities (Valenci & Vinai, 2004) Balk and Corr (2011) add that adolescents' feelings are very similar to those of adults.

The education system as a source of support for adolescents experiencing loss

The education system is prepared to deal with the crisis at the time of its occurrence or near it. This has clear guidelines and is anchored in the Director General's circular and professional literature (Ayalon, 2000; Chen Gal, 2003; Klingman, 1991). Clear instructions on how to deliver difficult messages to students in class, about the funeral and the oath of allegiance. Indeed, in the vast majority of cases, when a disaster occurs, the school staff mobilizes quickly and acts with infinite devotion and investment. However, it is usually found that this presence is temporary and does not last for long, that presence is fading away even though the feelings of distress continue to exist and do not disappear over time. The aim of the education system is to return to routine as quickly as possible, on the assumption that routine helps to cope. In this approach, the education system ignores the fact that the crisis is a process that may continue over a long period of time, and thus the loss of long-term consequences will be irreversible even if they do not appear to be examined (Ayalon, 2000). Thus, in the vast majority of cases, when a disaster occurs, students find themselves coping alone over time with intense distress and some with post-traumatic stress disorder. Dealing with such situations emphasizes the vitality and meaning of the counselor and the educational staff at the school (Mor, Luria, Gal and Siman, 2011).

Findings

Descriptive statistics

Variable	mean	Standard deviation (sd)	max	min
age	15.2	1.1	17	14
Number of brothers at home	2.5	1.29	5	0
Adaptation in school	2.5	0.12	2.7	2.5

Discussion

The aim of this study is to examine the adaptation of the adolescents in school, middle school age, after the loss of one parent, while emphasizing the extent of post-mourning adaptation.

The study attempted to examine the differences in the level and modality of adolescents in a two-way gender distinction, namely, the distinction between adolescent boys and adolescent girls at the level of adaptation at school for both fathers and mothers.

The research findings related to the hypothesis that there are differences in the level of school adaptation between adolescent's boys and adolescents' girls after the mourning of one of the parents suggests that there are differences between both sexes, so that the level of school adaptation among adolescents' girls is higher than the level of school adaptation among adolescents' boys.

These findings are on the same scale as academic research in the field (Cohen & Mannarino, 2011; Cohen, Mannarino, & Knudsen, 2004; Cohen, Mannarino, & Staron, 2006). This is due to the fact that the society requires different standards from the adolescent's boys than it requires the adolescent's girls, both sexes report, aggression, frustration, hostility, undermining self-confidence, lack of achievement, lack of interest, lack of ambition, passivity and under-achievement. However, the boys are more extroverted and the girls are more introverted.

A child who loses his mother will miss the experience of motherly warmth and love that the child needs most in his early years, leaving him alone emotionally (Granot, 2000). The father who remains is manifesting love through physical and existential concern and does not always succeed in granting the tenderness and warmth that the mother gave when she was alive. Loss of the mother leaves the child

with a great yearning for the missing mother and yet, with anger at women. The child can be attracted to adult women mainly, but feel threatened by them (Granot, 2000). A girl who loses a mother loses the central figure to emulate, identify and study feminine qualities. The daughter also loses the maternal warmth and tenderness and her partner. The loss leads the female child to find a solution with her father, which strengthens her dependence on him. The girl finds “Bab” (father) as a "partner," which may even harm her ability to establish emotional ties with her peers in the future (Granot, 2000). Appropriate encouragement and support, will increase the likelihood that the damage will be tolerable and will not destroy the child and the family life upon reaching adulthood. (Sacks, 1988).

Conclusion

Without a doubt, a parent's death is a great risk to the normal mental development of a child of any age. This situation confronts difficult feelings of anxiety, guilt, anger and depression at all levels. The way the child treats his loss and the emotional well-being he receives from those around him will have a decisive influence on his character and approach to life (Raviv, 1975).

The teacher and the child in crisis Lindgren (1967) argues that the teacher can play many roles as he represents society, imparts knowledge and imparts values, as well as supports the child and contains his anxieties. The expectation of the teacher is that he will help build the student's self and take care of his physical and mental health. Sometimes the teacher may fall under the yoke of expectations.

In examining the status of the teacher, one can discern the potential of providing crisis support: The teacher is a familiar figure to a student who usually knows him even before the crisis. The teacher is an adult figure, who sometimes replaces the parent, so the student has a willingness to contact him. The teacher is willing to receive emotional treatment and acceptance of the student especially in a crisis situation. The teacher also has a relationship with the parents, who sometimes see him as a figure for daily consultation. The teacher has the background and proper education in the field, and they have access to other expert consultation bodies. The teacher is a neutral figure who is not identified with mental health factors and his consultation is perceived as part of a normal life course.

Kelliman (1978) emphasizes that the more knowledge and willingness the teacher has to deal with these subjects, the more effective it will be in helping his students.

Of course, it is important to emphasize that in order for the teacher to assist the student in a crisis situation, he or she needs assistance from another professional factor in the school or community. The death of a parent can greatly affect the child. The effects are expressed on four main levels (especially if the mourning process was not correct):

Emotional level - the child sees the parent as part of him and after death, he feels incomplete, lacking in comparison to other children. This may create feelings of inferiority and jealousy for other children.

Cognitive - learning level - the child may show less interest in learning and may achieve poor achievement.

An aesthetic level - the child’s appearance is sometimes neglected that can cause his rejection by his classmates and the child himself, sometimes, shows less interest in his friends.

The social level - many times the orphan child finds himself rejected by his friends (Klingman, 1998).

References

Granat, A.
2014
"Treatment of traumatic grief in children who lost their parents in a car accident".
Granot, T.
2000
"Without you, the effect of loss on children and youth" Jerusalem: Ministry of Defense, publishing house.
Jacobs, R. J. Bavasso, G. B.
2009
"Re- Examining the long- term effects of experiencing parental death in childhood on adults psychopathology". The Journal of Nervous and Mental Disease, 197, 24-27.

Klingman, A.
1998
"Death and bereavement in the family". Professional literature review. Jerusalem: Henrietta Szold Institute. National Institute for Research in Behavioral Sciences
Rubin, S. Malkinson, R. Witztum, E.
2011
The Two- Track Model of Bereavement: "The double helix of research and clinical practice" In R. Neimeyer et al (Eds.) Invited paper for Grief and Bereavement in Contemporary Society: Bridging Research and Practice. New York: Routledge.
Shallow, R.
2012
"Loss and grief processes among children and adolescents". Hebrew psychology.

THE APPROACH OF THE INNOVATION FROM A GENERATIONAL PERSPECTIVE

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Abstract

Purpose *– Is to identify the specific features of current generations that can be geared towards the process of innovation*

Methodology/approach *- The issue of innovation from the perspective of generational theory*

Findings *– It is important in practice to use the characteristics of generations in all aspects of innovation*

Research limitations/implications *– For the development of innovation in the economy there are necessary measures adapted to each partner who has an influence on the labor market, measures which aimed directly at the active generations or those who are to enter the labor market*

Practical implications *– Adapting businesses to the demands of current and future employee generations*

Originality/value *– Addressing innovation from a generational perspective*

Key words: *Innovation**, 'Baby Boomers", "Millennials"***

Introduction

The scientific concerns regarding the generational topic occurred in the early '80s, among the first specialists who analysed this issue being William Strauss and Neil Howe (1991), experts in public policy. It should be mentioned that their studies referred to the area of the United States of America. Subsequent research studies outlined classifications containing different periods, valid for different geographic areas or even for different countries, with features of generations adapted to the historical developments in the territories concerned. Also, further studies have researched this topic more deeply and have exceeded the analyses at sociological level, leading to its use and expansion in areas such as: human resource management, marketing, psychology, sociology etc.

The Generational Theory

William J. Schroer (2018), one of the American researchers that studied the features of the generations from the beginning of the last century up to present, established features specific to each stage. In next table displays the birth and the maturity years of each generation, its current age and its important features.

Generation	Years of birth	Maturity	Current age	Characteristics
The Golden Generation	1928 - 1945	1946 - 1963	73 - 90	They have a strong moral, they are hardworking, managing, responsible, they love their family
Baby Boomers	1946 - 1954	1964 - 1972	64 - 72	Optimistic generation, that had big economic opportunities specific to the post-World War II period
Boomers II	1955 - 1965	1973 - 1983	35 - 45	Individuals oriented towards personal interests, skeptical towards mass-media and who lost their confidence in government

Generation X	1966 - 1976	1984 - 1994	24 - 34	The most educated generation (29% have higher education), pragmatic, cautious, the generation of children with divorced parents; sometimes called 'the lost generation'
Generation Y (Echo-Boomers or Millennials)	1977 – 1994	1995 - 2012	24 - 41	Technology-oriented generation, sophisticated in knowledge, skeptical of traditional marketing elements, more segmented as a public; the first generation of digital natives
Generation Z	1995 – 2012	2013 - 2030	6 - 23	The individuals of this generation grow up with the computer and the mobile phone at hand, having Internet access; they can benefit from an education aimed at laying emphasis on the individual; they are getting bored easily; briefly, they are: digital, social, global, mobile and visual; they have entrepreneurship abilities;

Adapting the succession of generations and their own characteristics to Romania, the boundaries of their delimitation suffer changes only for the period after 1989, as follows:

- The Generation X, referring to the period comprised between 1966 and 1976, overlaps with the time when the Decree no. 770 of 1966, in force in Romania at that time, led to significant demographic changes materializing in a nearly double birth rate from one year to another; as a result, they are people who were always in competition (for places in schools, lyceums, faculties etc.), who planned their resources and had to pass through significantly different historical periods; this generation in Romania is called the Generation of Sacrifice because, after 1989, for the purpose of the individuals' transition to an area of equilibrium, it demanded great efforts of economic, cultural and emotional adaptation (IRES, 2015);
- The Generation Y comprises the period between 1977 and 1994 and includes individuals now aged 23 to 41. In Romania, it is the generation that largely crossed two different historical periods – the communism and the transition period to capitalism, but its maturity period belongs to the period after the 1989 revolution. Specific to this generation is that the individuals belonging to it are creative, adaptable, internet and technology-oriented, loyal to the brands they like; it is considered to be the generation that seeks mentoring, counselling but also respect, inclusively by quality products and services;
- The Generation Z comprises people born between 1995 and 2012; its members have exceeded the maturity period recently and are relatively new entrants to the labour market, therefore, it is still being studied, precisely because it has very particular characteristics. This generation has had access to technology and digital environment ever since their birth, having advanced skills in this field since they are little children; they are multi-tasking; it is considered that the individuals of this generation are independent and flexible, dynamic, considering themselves to be the ones who want to change the world (It is to be mentioned that the above descriptions are slight and do not characterize other than in a summary manner the elements specific to each generation).

More and more it is spoken, in specialized media, about the Generation Alpha which started in 2013. Mark McCrindle (2014) also calls it 'the Tech generation' or 'net generation'. He believes that it is the most educated and dynamic generation of the mankind. Also, another feature of this generation is longevity, they will build their families late and will be very concerned about studying, they will be those who will experience the transition from the auditory and visual to a kinesthetic process. They will be difficult to motivate and challenge. The technology, whose evolution is explosive, will be the one that will accentuate the gap between generation Z and Alpha.

The Generational Perspective in the Human Resources Management

According to a research conducted at the global level by ManpowerGroup (2016), between February and April 2016, it resulted that the structure of the workforce classified on

generations will be the following in 2020: 35% will belong to Generations X and Y, 24% are from Generation Z and 6% are Baby Boomers. The joint work of these four generations is a real challenge, because each has its own visions, different aspirations, and the opinions of one generation about the others are diverse. For example, Generation X claims that those belonging to Generation Y are immature and superficial, while the Millennials think that their parents are contemptuous and skeptical. But those belonging to Generation Z have just reached maturity, and, as a result, their adult behaviors are still little known being currently studied.

Also, considering them from the employment perspective, the three generations predominant on the current labour market have different characteristics. The Brave New Workplace survey, conducted on approximately 18,000 respondents, students and employees from 19 countries and published in January 2017 (The study is conducted by Universum, INSEAD Emerging Markets Institute, The HEAD Foundation and MIT Leadership Center), showed the main features of the three generations, as well as their fears as employees. Thus, all the three generations consider that the ideal job is where they have the opportunity to develop themselves and manifest their initiative, but Generation X has, predominantly, a culture of integrity, Generation Y appreciates the risk-taking at the workplace while the employees of Generation Z appreciate making decisions hierarchically.

The fears of employees belonging to Generation X are mainly related to the fact that they will not get the retirement period, the employees from Millenials are afraid of the fact that they work too much and may lose the balance that must exist between work and family. Regarding the Generation Z, most of their fears are related to the fact that they will not be performing at their jobs. For all generations, the most common fear concerns the prospect of job loss, its stability, this attitude being characterised by the phrase "job security".

An important aspect is the fact that Generations Y and Z are innovative generations, oriented to the creation, application and implementation of the novelty, in order to increase the performance of the organisation to which they belong.

A constant feature of the economic life is related to the fact that the labour market is continuously provided with the workforce having a certain structure of age, education, backgrounds, class etc, but, at the same time, the characteristics of the supply are influenced by the types of generations that prevail, the technology existing at that time, the organization of firms, the public and economic policies of the countries etc. For example, in 2020, the structure of supply on the labour market is represented in proportion of about 70% by employees from Generations X and Y, in relatively equal percentages, but, in 2050, the Generation X will be out of the labour market, being replaced by Generation Y and will be complemented by Generations Z and Alpha. As a result, the overall characteristics of the market will be much modified in accordance with the particularities of the generations which compose it. This aspect will require the adjusting of the behaviour of firms from the following perspectives:

- staff recruiting and selecting method
- the way of rewarding the employees, of providing the salaries and other benefits
- the management of the working time and rest time
- the working conditions, the workplace facilities etc.
- the way to communicate with the employees (the open and honest communication remaining a constant element), the level of the employees involvement in the decision-making system;
- the way of building the teams and the structure of the work organisation – individual or in teams and the organisation of labour in itself, the way of managing the organizational structure of the company;
- the type of work and of the work place;
- the skills required and the way in which the level of training will be completed
- etc.

All these aspects will be totally different compared to the way in which firms do these activities in the current period.

Perspectives of the Innovation Approach

A very important thing is related to the way in which the novelty and change will be generated and the creativity and innovation processes will be stimulated. Innovation is found both in the core business and in all its support activities, inclusively in the area of human resources. The innovation being, in fact, the means by which a competitive global economy can be sustained, Tony Wagner (2014) said: "We urgently need a new economic growth engine for the 21st century. The solution to the economic and social challenges is only one: the establishment of a viable and sustainable economy which is to create jobs without polluting the planet. ... A single word is needed: innovation." Generations Y and Z have the characteristics of innovators and the firms will have to find means by which to stimulate and capitalize this potential.

In order to discover and highlight the innovative potential of these generations, it is important to develop a cohesion of the family, of the school, as an exponent of the state and subsequently of the employers (in the active period of life). In this sense, from the perspective of education, we appreciate that there is a need of strategies related to the national system of education which the state has the obligation to create for future generations. It has to support these generations by its own means it can use. Nevertheless, the employers have a significant role, both in the periods in which the individuals are their employees, but also in the stages of collaboration with them: practice school or university, internship, scholarships etc.

Also, regarding the area of school and academic education, we consider that for the formation of future creative and innovative employees the following are necessary:

a) programs of studies whose curricula are meant to provide scientific notions, practical methods and tools, as well as a level of professional knowledge on domains, and which are to transfer in the economy the required *expertise* (knowledge);
b) the development of pupils and students *creative thinking* skills that will allow flexibility and imagination in addressing all the issues;
c) means for finding and defining the individual's *motivation*, without motivation, the other two elements: expertise and creative thinking are lost; the types of motivation (extrinsic and intrinsic) should be treated differently: for extrinsic motivation, the systems of rewarding and sanctioning are important, while, for the intrinsic motivation (a type of motivation that is essential for creativity and innovation), the emphasis is put on the tools (even playful) used to lead the passions and interests of individuals to a final goal that is important to each of them.

Regarding the firms' contribution to the stimulation of the innovative processes, they must find solutions adapted to the needs of the individuals. To be closer to their needs, the companies have to be more concerned to know their own employees because the new generations do not follow the typical employee pattern: particularly those from Generation Z, who want a flexible schedule which they should be able to choose for themselves, who work better individually, not in teams, who do not accept so easily the authority given by a hierarchy, who are multi-tasking etc. Finding smart solutions tailored to future generations, their resources of creativity and innovation can be capitalized in a higher mode, the benefits returning to the firm through organizational performance. In the same way, managers specialized on companies innovation will have to adapt their specific management techniques and instruments according to the characteristics and requirements of the new generations and the open communication is the element of support, along with an immediate feedback of the work performed. Also, the younger employees of Generation Z, for example, that get bored quickly, migrate to other jobs, which is a dangerous phenomenon for firms (after the firms train young employees according to the organisational demands, the young workers migrate to other firms, which entails a decrease of the firm profitability by staff fluctuation). This thing requires the need for firms to find flexible and adaptable solutions to reduce the phenomenon of staff fluctuation.

From the perspective of the state, its sustainability should be reflected throughout the life of the individual, starting from the extracurricular programs that aim at generating and stimulating creativity and innovation, the support of some forms of training meant to provide the knowledge related to entrepreneurship and the creation of real life experiences which are to challenge them in finding solutions, the professional orientation towards the areas that correspond to the skills etc. At the same time, through measures of economic nature, the state must challenge and support the projects initiated by young entrepreneurs, by funding programmes for start-ups, projects and competitions on entrepreneurship issue, by fiscal facilities. The state has obligations related to these generations

because they are a source of native creativity which, oriented towards new and innovation, generates development, bringing value-added in the whole society and economy. Another role of the state is related to state policies which are meant to preserve the creative and innovative native potential in the country. The policies oriented in this direction must be modelled depending on the attitude of future generations - their needs are related to a good quality of life, which, with the current mobility, one can find in any area of the globe.

Conclusions

There are, also, opinions according to which studying and classifying the employees by generations is arbitrary and, sometimes, even exaggerated. The argumentation of these ideas stems from the following aspects: people have their own temperaments and behaviours, which determines the presence, within different generations, of individuals with common characteristics and behaviors. At the same time, each individual is influenced by elements from his environment, which may lead to the conclusion that the same individual may have a different behaviour in different organizations. Also, the employees have a different behaviour depending on the situation, context etc. But, with all the arguments which combat the theories of the generation, it is risky for organizations not to pursue and even to ignore the peculiarities of the current generations, to estimate the future generations' behaviour and not to adjust their behavior to their needs. This is important, all the more so as decisive for the belonging to one generation or another are the attitude, the behavior and its values and not the date of birth, in itself. At the same time, a generation is identified by a common identity, but also by common experiences (referred to as social-learning) which it lives. However superficial the generational approach may seem, to ignore these aspects is an imprudence and a waste of resources for the entire global human system.

References

IRES – Institutul Român pentru Evaluare și Strategie
2015
"Generation X" IRES Study
ManpowerGroup
2016
"Cariera și generația Y: Viziune 2020. Informații, date și sfaturi practice de la experți în forța de muncă"
McCrindle, M.
2014
"The ABC of XYZ: Understanding the Global Generations" Sydney: UNSW Press, pp. 218 – 228.
Schroer, W. J.
2018
"Generations X,Y, Z and the others" http://socialmarketing.org/
Strauss, W. and Howe, N.
1991
"Generations: The History of America's Future, 1584 to 2069", William Morrow Paperbacks, ISBN 0-688-11912-3
Wagner, T.
2014
"Formarea inovatorilor. Cum crești tinerii care vor schimba lumea de mâine", Editura Trei, Bucharest, pg. 17

THE INFLUENCE OF PRODUCT PLACEMENT IN BUYING DECISION

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Abstract

Purpose *– A problem faced by traders in communicating with media consumers is that in advertising television breaks, which they consider to be uninteresting and boring or even annoying, they may stop the program, scroll or switch the channel. Thus, the product placement strategy was adopted as an integrated marketing strategy. This technique has become very popular along time, thru which the public can receive the advertising message without interrupting the programs and can choose whether to accept or reject that message.*

Methodology/approach *– The methodology applied in this research is based on the qualitative analysis of specialized literature, the use of questionnaire survey and semiquantitative analysis of the obtained results.*

Findings *– This paper aims to investigate the perception of the 18-45 years old public from western Romania regarding product placement in movies or TV programs and to analyze whether there is an influence of these placements on the buying decision. At the end of the paper is proposed a conceptual framework for product placement,traditional and digital media.*

Research limitations/implications *– The research is conducted at the Polytechnic University of Timisoara, on a sample of 18-45 years of age, most of them being young students, master students, PhD students or postdoctoral researchers.*

Practical implications *– Assessing the public's perception of product placement in media contributes to identifying the strategy that attracts and maintain the customers of some products.*

Originality/value *– The paper evaluate the specialized literature to identify the market trends. To outline a conceptual framework, the authors conduct a survey by questionnaire. In the end marketing trends 3.0 and 4.0 are evaluated in order to predict the buyer's behavior.*

Key words: *brand influence, product placement, marketing, communication.*

Introduction

Among other forms of advertising, besides the classic advertising spot, it also includes the product placement, which refers to the insertion of a brand or logo into a movie, TV show, music video or video game.

According to the Audiovisual Law, in Romania, the product placement is allowed in "cinematographic works, movies and TV serials, sport and entertainment programs. In these programs clear mentions should be made of the existence of placements at the beggining of the program, after the classic commercial breaks and also at the end of the program, in order not to create confusion for the viewers. "(Law No 504/2002, art.31).

In the practice of product placement certain ways of using the product are recognized: it can be worn, touched or just mentioned (Shapiro, 1993; Akdoğan and Başar, 2015). However, this "must not directly encourage purchase by exaggerating the products in question" (Code of Practice in Commercial Communication, Article 24).

The technique of product placement and brand placement in the media has become commonplace especially in movies and entertainment programs, which are among the most watched television programs (Gupta, and Gould, 1997; Avery, and Ferraro, 2000; Bressoud et al., 2010). These placements occur when the viewer is captivated in front of the TV and emotionally involved.

In general, it is intended to increase sales but also to increase brand awareness, improve the image of a product or launch a new product (D'Astous, and Chartier, 2000; De Gregorio, and Sung, 2010). Another goal of traders is to gain an advantage over the classic ad format. The product being integrated into real life, it is closer to the consumer and the chances that he will buy them grow (Delorme, and Reid, 1999; Bressoud, and Lehu, 2008; Gaille, 2017).

Traditional advertising breaks have a long enough duration of over 10 minutes, which makes many people switch the TV channel (Calfee, and Debra, 1994; Brennan, and Babin, 2004; Guennemann, and Cho., 2014; Moore, 2017). However, during a program, product placements can provide realism by integrating them into the action of the program, and the audience can react positively without perceiving that they are exposed to the action of an ad. So inserting product brands during shows is appropriate to reach viewers looking to get rid of regular commercials, and the message is certainly received.

Different studies show that product placements are accepted because they enhance the realism of the show if they are not over-emphasized (Nebergahl, and Secunda, 1993; Gupta, and Gould, 1997) or repeated because they distract attention (Homer, 2009; Gürses, and Okan, 2013).

Product placement is seen in a positive light also if it is incorporated into a favorite television show (Muzellec and others, 2013), which features favorite celebrities, to which the audience has admiration (Kahle, and Homer, 1985; Morton, and Friedman, 2002; Muda, 2014). According to a study made by Starcom Romania (2017), on one of the most visited sites in the world, YouTube, the focus of young Romanians (63%) is aimed at celebrities (actors, singers, athletes, television hosts) which can influence them to be more receptive and motivated to use the same products promoted by them.

Regarding their subtlety, product placements can be considered to have a subliminal message because consumers are not aware that the products they see in a movie or entertainment show have reason to promote (Hackley, and Tiwsakul, 2008; Muzellec et al., 2013). The technique is also called "hidden" promotion (Balasubramanian 1994; Nebenzahl, and Jaffe, 1998; Martin, and Smith, 2008 Sung et al., 2008).

This marketing strategy involves "subliminal" or "subconscious" psychological effects on consumers (Morton & Friedman, 2002), being considered a deceptive practice (DeLorme & Reid, 1999; Kaikati, and Kaikati, 2004) by penetrating into the human mind without consent, forcing it to perceive a message that may be unwanted (Calfee & Ringold, 1994; Roy & Chattopadhyay, 2010).

The subliminal refers to the area of the unconscious, more active than consciousness, in which information, memories, actions passed through the consciousness filter and which are in a latent state are stored, but can be remembered at any time. It has utility in the learning process, but also in life adaptation (Muda et al., 2014; Nagar, 2016). A human being stores in the subconscious everything he sees, hears, or the feelings and emotions he is experiencing.

Even if some messages are not perceived by the lack of attention, the subconscious registers them (Petty & Andrews, 2008). A study by Nelson in 2002 showed that as soon as they played computer and video games, the participants recalled about 25-30% of the games placed in games, and after a period of 5 months they remembered about 10-15% of the marks.

The buying decision starts at the subconscious level and because it controls about 90% of the activity of the nervous system, it can influence the purchasing behavior of the consumers.

Advantages of product placements

Presenting products through placements in television programs and movies makes viewers aware of certain product brands due to exposure time (Nelson & McLeod, 2005). It can be considered that the length of life is longer for the brands inserted during the programs than for the classical advertising (D'Astous & Chartier, 2000). For movies, they run in local cinemas, international cinemas, then they

are taken over by specialized or regular television channels. The large surface area it covers offers an important advantage for product placement.

Though originally movie placed products have been used as a props, companies want their products to be used as decoration to make them known, then big companies have come to pay big amounts of money for their products to appear in movies or television shows. In 2002, according to Daily Variety, an American magazine, for placing products in the movie Minority Report, brands as American Express, Pepsi, Nokia or Reebok contributed with 25 million dollars to the 102 million dollars budget and Heineken paid 45 million dollars for product placement in the movie Skyfall.

According to PQ Media, a research company, worldwide 8.25 billion dollars was spent in 2012 for product placement, and in 2014, 10.58 billion dollars. Income from global product placements rose 14 % in 2017 to 15.68 billion dollars, main channel being television, with revenues of 10.5 billion dollars. Product placement is expected to grow at a similar rate in the period 2018-2022.

Although there are high spending on product placements, there are also benefits. In 1983, Tom Cruise wore Ray-Ban Wayfarers sunglasses in the movie Risky Business, which became an emblem of the 80's style, the movie bringing popularity to the actor. In the same year, sales of sunglasses rose from 18,000 pairs to 360,000 pairs, reaching in 1986 to 1.5 million pairs sold due to product insertion into several movies. Also in 1986, in the movie Top Gun, the same actor Tom Cruise promoted Aviator Ray-Ban sunglasses, their sales rising 40% after the release of the movie.

In a US study by the Transportation Research Institute of the University of Michigan regarding people between 16-44 years old who obtained their driving license from 1983 to 2014, in recent years there has been a slight decrease from 79.7% in 2011 to 76.7% in 2014. Although the interest of Americans in driving cars has fallen over time, there is a high interest in placing cars in movies. When we say James Bond, it would not take us a long time to think about Aston Martin. The association between agent 007 and Aston Martin is almost inseparable. In 1995 in the movie James Bond GoldenEye also featured the BMW Z3. For these placements, the company spent 3 million dollars, and the result was an increase of 240 million dollars in model sales.

Since 1995, the model Chevrolet Camaro had a steady drop in sales in the US until production ceased in 2003. After redesigning and appearing in the movie Transformers in 2009, Autobot Camaro version has recorded 60,000 units sold, and in 2010 Camaro Transformers Special Edition sold 80,000 cars. The Audi brand also has a history of product placement in cinema: iRobot (2004), Iron Man (2008), The Avengers (2012), Captain America: Civil War (2016).

It is worth noting that in 2013, Smurfs 2 covered its 105 million dollars budget due to product placements in the movie and made a profit of 45 million dollars even before the release of the movie.

Although initially the insertion of product brands in movies and television programs was made by discreetly displaying the physical product or the logo in the background of a scene, over the years it has become a central part of the movie or TV program, the products being presented in the foreground, making them more visible. For example, in the show Romanians got talent, one of the most appreciated TV shows in Romania, Coca-Cola or Tymbark bottles appear visibly on the jury table.

Product placements are more effective if they are integrated into the scene (D'Astous and Chartier, 2000) and have a positive effect when they remain in the memory of people (Bressoud et al., 2010; Shrum et al., 2009). Due to computerized technology, these can be changed to suit different audiences. Products can be inserted even in TV programs made in the past and re-broadcast, and virtual insertions can be changed from one edition to the next. This way, product promotion can be achieved even when programs are resumed. For example, in the movie Demolition Man (1993), when the action of the film unfolds in 2032, in a conversation between two actors, Taco Bell is mentioned as the only fast-food restaurant that has survived until then. When the same movie ran in Europe, in the same scene was mentioned Pizza Hut, instead of Taco Bell.

The same practice is also used in video games. For example, during his first presidential election, electoral billboards with future US President Barack Obama were introduced in various video games. Video games can be a powerful advertising medium. According to a study by Starcom MediaVest Group in 2016, in Romania 59% of the online population is playing electronic games or in mobile applications.

Another way of presenting products to the public refers to placements in music videos. Most of today's video debuts online where placements are clearly visible. These are incorporated in the thematic context in which they are filmed (for example: inserting brands of food or drink into kitchens scenes or different locations). The products become an integral part, having an important place in the story, giving the feeling that their place is naturally there (Stephen and Coote, 2005). One advantage of these videos is that they are accessible 24 hours a day, making it much more people to be exposed to placements.

Disadvantages of product placements

Beside from the different advantages of product placements, there are also disadvantages, such as the fact that during a movie, for example, there is no guarantee that the placement will be noticed, not having to much control over the moment when the brand will be displayed because there is the risk that the scene in which the placement appears will be edited. Some movies or TV programs are delayed for months until to be launched in the television grid. Therefore, if the release of a new product it is hoped that will coincide with the release of a movie or TV show that it will be quite difficult to achieve (Kwo, and Jung, 2013; Kit, and P'ng, 2014). It can also happen that a brand invests million of dollars in product placement into a movie or TV show that turn out to be a cinematic failure or to be canceled shortly after launch (Soba, and Müfit, 2013; Starcom, 2017).

The research methodology

In this research the questionnaire survey was used. The questionnaire was applied online, using the Google Form platform. The sample was randomly selected and consisted of 300 people. As a market research tool, the questionnaire contain 16 questions, of which 14 closed questions and 2 open questions and was conceived in the following directions:

- how it influence the association of a brand with the name of a celebrity the buying decision,
- how different people perceive the concept of product placement,
- how receptive consumers are to this product placement technique,
- what influence these placements have in buying behavior.

Following distribution in the online environment, the questionnaire was completed by 102 people, aged 18-45, of which 64% were students of the Polytechnic University of Timisoara, the Faculty of Management in Production and Transport, and 36% were graduates or postgraduate students. The results of the research are presented below.

First, the participants were asked how many hours per day they spend in front of the TV. Of those who answered the questionnaire (see Figure 1), 45% said they spend less than 1 hour per day in front of the TV to watch their favorite shows, 32% spend between 1-2 hours per day, 19% between 3-5 hours per day and 4% more than 5 hours per day.

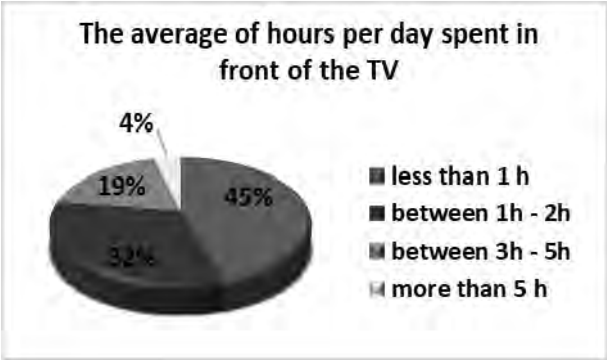

Fig. 1. Number of hours spent by viewers in front of the TV

The next question is about the genres of television programs preferred by the respondents. Being a multiple-choice question, they were able to select multiple answers. Among the preferences of those who answered the questionnaire (see Figure 2) are: movies (56.7%), entertainment programs

(43.3%), music (34%), news (36%), sports (18%), documentaries (3%), economic programs (1%) or culinary programs (1%).

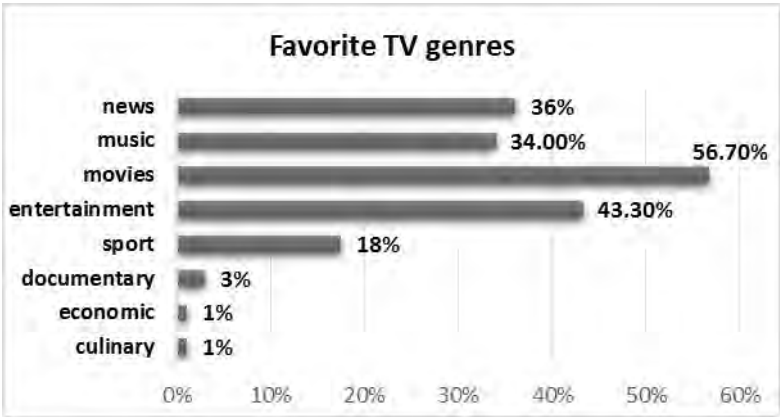

Fig. 2. Public's preference for television programs

To the question "Do you have a favorite celebrity from Romania? (singer, actor, sportsman, television person, etc.)? ", 58.8% of respondents responded negatively, and 41.2% responded affirmatively (see Figure 3).

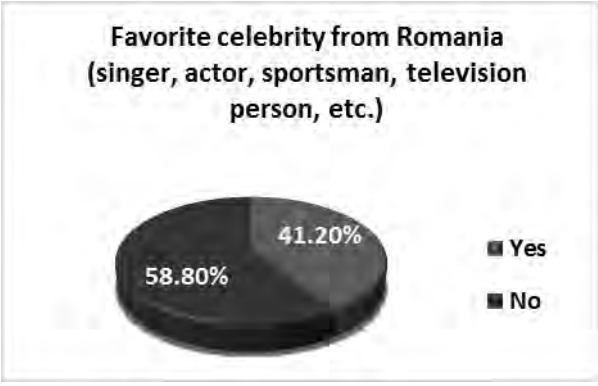

Fig. 3. Public's preference for a celebrity from Romania

Further, the interviewees were asked to judge their perceived influence from the celebrities on their behavior, buying product, fashion style and lifestyle. Regarding the influence of celebrities on their behavior (see Figure 4) , 89% of respondents said that they were not considered influenced, while 11% felt an influence from their favorite celebrities.

Even if the names of the favorite celebrities are associated with a specific brand, in terms of purchasing products, most of them, 71% of all respondents (see Figure 4) do not change their attitude towards a particular brand of products, because the admiration for a public person can be related to this as a person and not with the products he promotes. However, 29% think they are influenced by celebrities in the purchase of certain products

In the case of fashion style, it is noticed that 49% of all respondents consider themselves to be influenced by the style of the celebrities, and 51% of the people do not prefer let them be influenced (see Figure 4).

The lifestyle of celebrities has an influence on the lifestyle of 14% of respondents, while 86% do not change their lifestyle as other people live (see Figure 4).

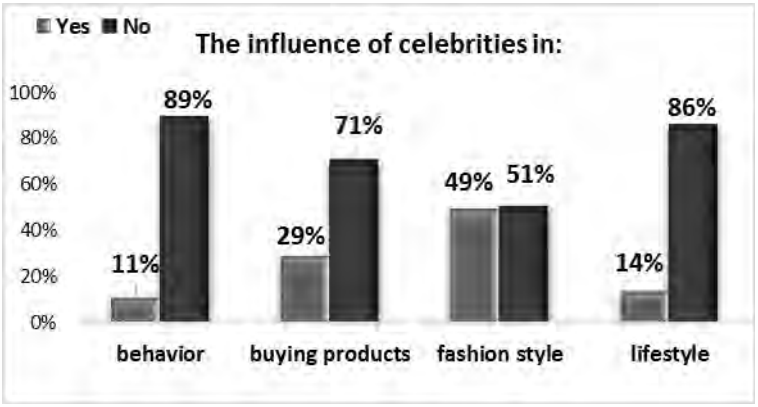

Fig. 4. The influence of celebrities in buying products

To the next question, "How important is the brand awareness of a product for you?", the people surveyed were asked to give ratings from 1 to 5 on a scale of appreciation of importance, where 1 = unimportant and 5 = very important. The awareness of a brand for the participants in the study is quite important (see Figure 5): 42.2% rated 3, 34.3% rated 4 and 6.9% rated 5. For 7.8% brand awareness is not important, giving grade 1 and 8.8% considers it to be of little importance with grade 2.

Fig. 5. The importance of brand awareness of a product

To the open question "Would you associate the name of a celebrity with a brand name? (if yes, can you give examples?) "(see Figure 6), 71% answered negatively and 29% affirmatively. Among the examples were given names of famous artists from the Romanian or international music industry (Andra-Garnier, Delia-Batiste, Inna-Coca-cola, The Week-Puma), Romanian or foreign actors (Leonardo di Caprio-Annick Goutal Eau d'Hadrien, Stela Popescu-Catena) or athletes (Cristiano Ronaldo-CLEARmen, Cristian Chivu-Mercedes-Benz, Hagi-BMW).

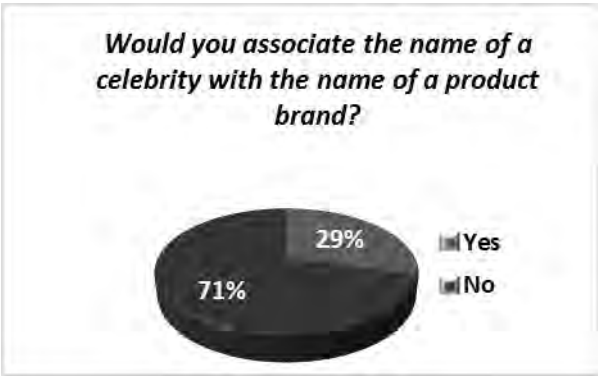

Fig. 6. The association of brands with the names of celebrities

To the next question, "Do you think that associating a brand with the name of a celebrity influences the public in buying products? " (see Figure 7), 74.5% of the answers were affirmative, and 25.5% were negative.

Fig. 7. The influence of association of a brand with celebrities name in buying product

The following questions in the questionnaire refer to product placements, how this concept is perceived, how receptive people are to the placements of television programs and what influence they have in buying behavior. To the question "Are you familiar with the notion of product placement in the media?" (see Figure 8), 67.6% said they are familiar with this notion, while 32.4% are unfamiliar.

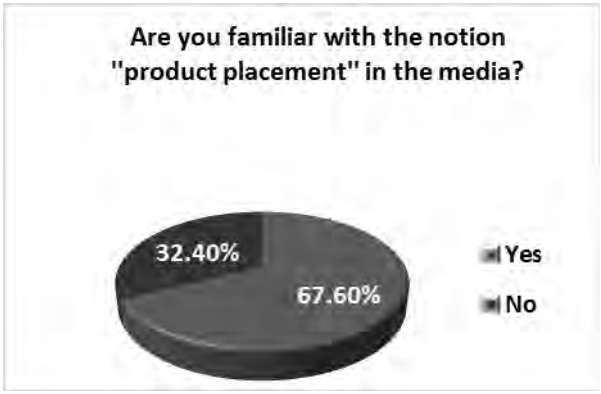

Fig. 8. The familiarity with the term "product placement"

To the question "What do you think is the purpose of these product placements?", of those who understand the concept of product placement (see Figure 9) consider it a marketing strategy to increase the sales of some products (41.7%), or another way to promote a product (36.1%), or a way to increase the awareness of some products (12.5%). A lower percentage of people (6.9%) consider it's a hidden advertisement or a technique to associate products with certain celebrities (2.8%).

Fig. 9. The purpose of product placement in the media

To the question "Have you noticed while watching a movie / TV show some well-known brands?" (see Figure 10), 74% responded positively, 1.4% responded negatively, and 24.7% were likely to have noticed these placements, but when they filled in the questionnaire they replied that they did not remember.

Fig. 10. Noticing product placements during a TV show or movie

The answers to the open question "Can you remember product brands you have observed and in what TV show / movie?" (see Figure 11), were 38% positive and 62% were negative. The brands of products that remain in people's memory are varied, from food products (Delikat, Nescafe, Knorr, Barilla, Lays), beverages (Coca-Cola, Pepsi, Tymbark, Corona), energy drinks (RedBull), cosmetics (Garnier, Head&Shoulders, Rexona), clothes (Adidas), detergents (Ariel, Dero, Cif) to telephone services (Telekom), cars (Mercedes, Audi, Aston Martin, Lexus) or electronic equipment (Apple). As examples of brands observed during a TV show or a movie were: brands Coca-cola, Coseli and Fairy in the show Chefs to knives, really?, La Măruţă or other culinary show, brand Telekom in the show Romanian got talent, brand Tymbark in the show I know you from somewhere, brands Rexona, Delikat, Nescafe, Barilla, in the show Exatlon, brand Aston Martin in the movie Skyfall, brand Corona in the movie Two and a half men, or brands Redbull and Corona in the movie Fast & Furious.

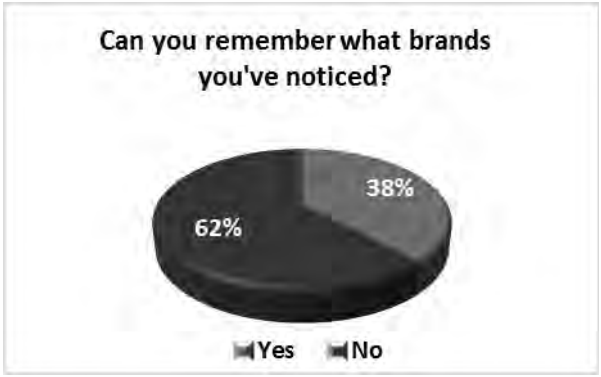

Fig. 11. Remembering product brands placed during a TV show or movie

To the question "How would you describe this product placement technique?", although many respondents to the questionnaire (see Figure 12) perceive placements as another way of promotion, more attractive than traditional advertising (34.7%), an almost similar percentage of people are indifferent and do not pay attention to this marketing strategy (40.3%).

Others believe that the technique offers the consumer a better understanding of the use of a product (19.4%), but some of the respondents had a negative reaction because they consider it a subtle way to attract attention to products (1.4%) or because they think that a greater importance is given to brands of products than to the broadcasts themselves. (4.2%).

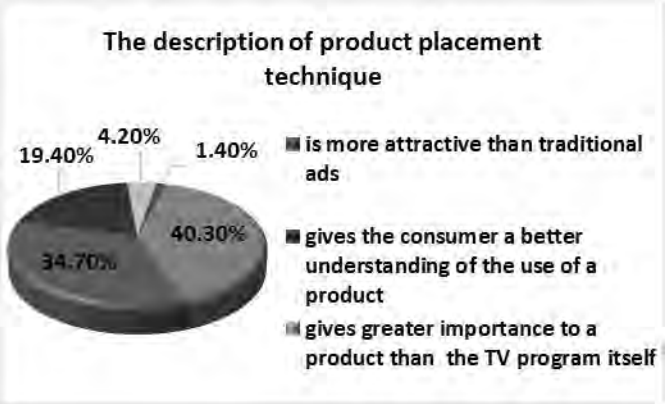

Fig. 12. The description of product placement technique

To the next question, "What mood is induced to you by viewing product brands during your favorite TV programs?", of those who had a positive attitude when viewing product placements during their favorite TV shows (see Figure 13), 20.8% are not bothered if they see different products when they watch a television show, 19.4% believe that it is common for certain products to appear during television shows, because it gives realism to the broadcasts and 16.7% have also shown a curiosity about the products presented.

When it comes to these placements in the media, 33.3% of respondents have an attitude of indifference. This may arise because people are mindful of the action that is taking place, the whole story of a movie or TV show.

Depending on how much they insist on some products, the audience may be bothered or not. 4.2% confirmed that exposure to placement causes them to change their mind about some products, and for 5.6% the presence of these placements is irritating and is a distraction.

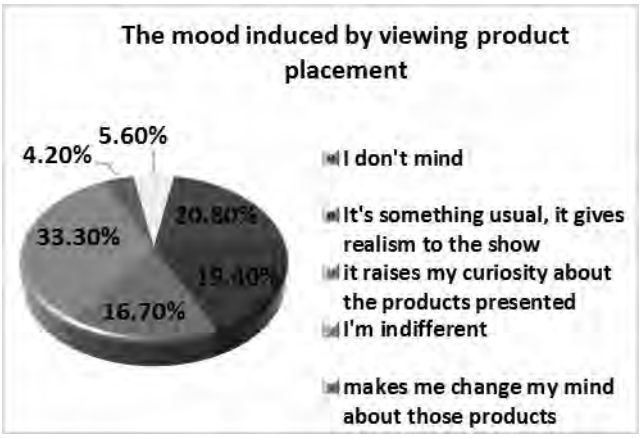

Fig. 13. The viewer's mood after viewing product placements

To the question "Are you influenced by product placements in the media in purchasing a product?", 28.8% responded affirmatively, and 71.2% answered negatively (see Figure 14).

Fig. 14. The influence of product placements in purchasing a product

The last questions in the questionnaire are demographic and relate to the respondents' age and gender.

Most of the respondents to the questionnaire (see Figure 15) are aged 19-25 years (61.8%). The rest, 1% are aged under 18 years , 21.6% are aged 26-35 years, 13.7% are aged 36-45 years and 2% are over the age of 45.

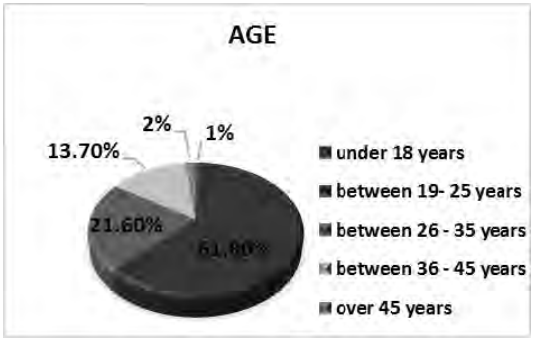

Fig. 15. The age of those who answered the questionnaire

Among the respondents, 66.7% are female, and 33.3% are male (see Figure 16).

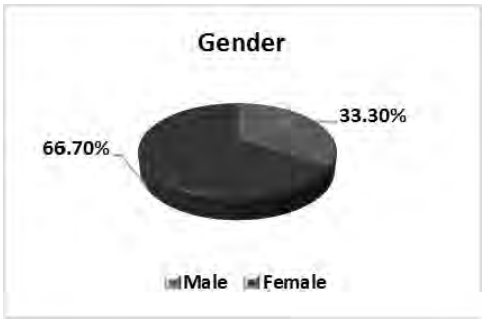

Fig. 16. The gender of those who answered the questionnaire

Most of the respondents (67.6%) said they were familiar with the notion of "product placement" and 32.4% were unfamiliar with the term. Although some have not heard of this term, however, most of them (74%) have noticed brands of products known during a movie or television show, only 1.4% denied it, and 24.7% were likely to be noticed these placements, but said they did not remember.

In a study by Brennan & Babin in 2004, it was found that people better remember known brands than those that are unknown to them. Moreover, the results of this study show that the brand's awareness is quite important for the participants. On a scale of importance (1 = unimportant and 5 = very important), 42.2% gave the grade 3, 34.3% gave the grade 4, and 6.9% gave the grade 5.

Making an analysis of the answers to the questions " What mood is induced to you by viewing product brands during your favorite TV programs?", And "How would you describe this product placement technique?", people who said they were not bothered by this product placement technique (20.8%) and those who had curiosity about the products presented (16.7%) have shown this positive attitude because they perceive placements as a more attractive form of promotion than traditional advertising (34.7%). Those who answered the first question that it is common for certain products to appear during TV programs because they offer realism (19.4%), at the the second question, they considered this technique to be beneficial because it offers the consumer a better understanding of the use of a product (19.4%).

Some have shown a negative reaction to this promotion technique, considering that a greater importance is given to brands of products than to broadcasts themselves (4.2%), others appeared to be irritated (5.6%) as it is found everywhere in the media,it's purpose being in fact "hidden advertising".

However, 33.3% of respondents are indifferent to this marketing technique and do not pay too much attention to it. This indifference can be a natural reaction to protection against so many repetitive, negative, and unnecessary informations in the media. As they believe that the purpose of placements is to increase the sales of some products and many of the products promoted on television are harmful, they can be very easily determined to remain indifferent to this technique.

The conceptual framework of product placement: traditional versus digital media

After the review of specialized literature, which presents different results of product placements in both traditional and digital environments, we have turned to researching the existing situation at the students level. The surprising finding of this review is that the factors that increase the memorability of a product placement event will also tend to reduce consumer ratings and the probability of choosing the recommended brand.

In the proposed conceptual framework (see Figure 17), we try to integrate these findings by highlighting the factors that change how a product placement event is perceived by a viewer. In the case of traditional product placement, the degree of product retention proves to be higher compared to the digital one. Instead, there are a number of tools in the digital media wich will help to mark the information (retaining it for a future use). The length of occurrence can be increased in the digital media as a result of the occurrence of the cascade effect (a user transmits the information to another user). The degree of innovation increases proportionally with the degree of digitization of product promotion, and the integration of information technology into marketing activities contributes to the development of some methods of retaining customers and attracting new ones. These elements are included in the further systematized framework.

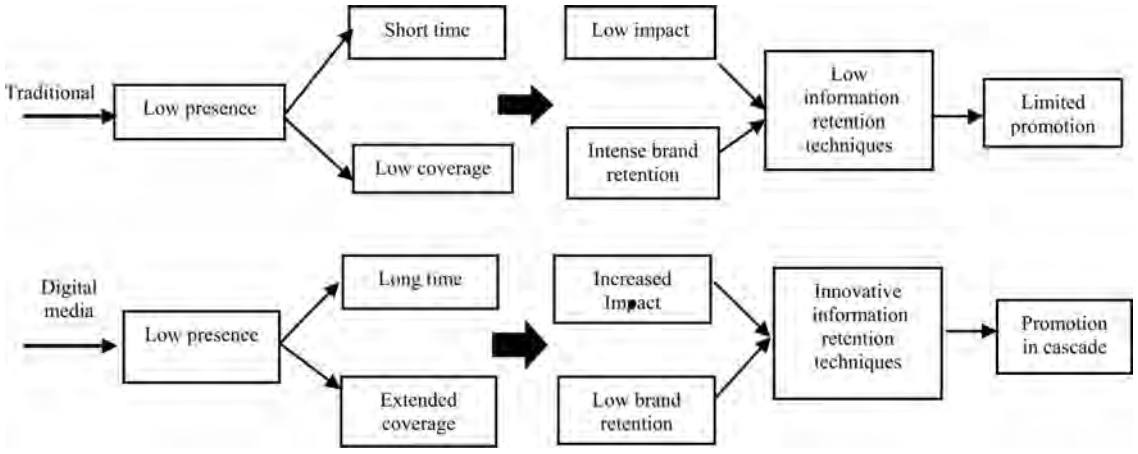

Fig. 17. The conceptual framework of product placement: traditional versus digital media

Figure 17 shows a comparison of the product placement traditionally and using digital media.

Product placement: Marketing 3.0 and Marketing 4.0

Marketing 3.0 emphasizes the customer as a whole, considering it as an ensemble (with material, emotional and spiritual needs, a marketing capable of satisfying the most noble cases of humanism). This concept integrates cultural, spiritual and collaborative marketing. Cultural marketing is closely linked to globalization (Taejun et al., 2011). People are increasingly connected with the world, but tightly connected locally. Spiritual marketing focuses more strongly the corporate side, which has to pay proper attention to both clients and competitors who deserve to be treated with respect. Maintaining and winning clients loyalty means applying the deepest values in a clear and consistent way. Collaborative marketing puts emphasis on the prosumer. Through this concept, the consumer speaks directly with the company, creates content and ideas, criticizes or applauds a corporate media choice (Nelson, 2002; Nelson, and McLeod, 2005; Obermiller, and MacLachlan, 2005; Petty, and Andrews, 2008; Stamford, 2018).

Marketing advances with the technology, integrating concepts of information technology into developed concepts. Marketing 4.0 focuses on design strategies that enhance brand-consumer relationships. "New consumers" are concerned about consuming what they need in a sustainable and responsible way towards the environment and society. Marketing 4.0 and future marketing concepts focus on big data. Companies start generating large amounts of information about consumer-company brands relationships through a diverse network of channels that influence the buyer's decision process (Sivak, and Schoettle, 2016). This continuous flow of information about the consumer audience and their interactions is very important to create new marketing practices such as buying media programs, audience segmentation, and real-time marketing. The "product placement" strategy, as a result of the research, is an intermediate step between Marketing 2.0 strategies (generally accepted by the usual public with traditional promotion) and Marketing 3.0. Taking into account that 37.5% (about one-third) of the investigated subjects agrees "product placement" relative to the other two thirds, indifferent, or with negative attitude. It is worth noting that consumer's perceptions and attitudes are changing faster than those of companies in moving towards creating value added products through Marketing 3.0 strategies, the companies, most of them beeing prone to the Marketing 1.0 and Marketing 2.0 concepts. Marketing 3.0 and Marketing 4.0 focus on sustainability and integrate environmental, social and economic principles into the company's development strategy (Williams et al., 2011). Product placement within Marketing 3.0 and Marketing 4.0 integrates elements of collaborative innovation and directly, culturally and spiritually engages the consumer.

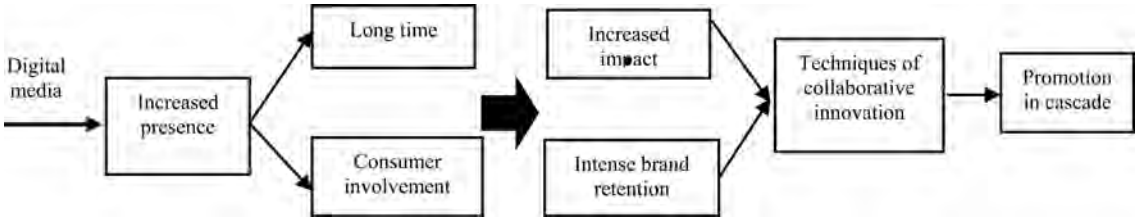

Fig. 18. The conceptual framework of product placement: Marketing 3.0 and Marketing 4.0

From the point of view of promotion, product placement, Marketing 3.0 and Marketing 4.0 integrates numerous data about the clients that the company owns to increase the impact of products on the client.

Conclusions

Behavior and purchasing intentions are influenced, among other things, by attitude towards advertising, the involvement in watching a movie or a TV program, the education level, age or cultural differences (Taejun et al., 2011). Each individual reacts differently to the subliminal message of product placements, some tend to become mistrustful in advertising (33.3%) and have a critical attitude, considering the action of placements as a disruption and not something pleasant, others have a positive attitude, considering the technique more attractive than classical advertising (34.7%).

Over 28.8% of respondents, the product placement strategy in TV shows has an influence on the buying decision, although the purchase is not an immediate one because the consumers search for information about products from different sources, most often from online consumer reviews (Sen &

Lerma, 2007). The association of a brand with the name of a celebrity can create a favorable impact for the public (74.5%) and because of their credibility they can influence the buying decision of some products (29%).

The modern consumer is aware of the fact that celebrities are paid to associate their image with a brand, and even if they have a preference for a certain celebrity, that will not influence their lives or the decisions they make.

The limitations of the research can refer to the size of the sample. This paperwork aimed mainly students. A sample of 102 respondents may be very little to have a significant effect on a research. A larger sample could have caused another result. Another limitation is from an ethnic and geographical point of view. There have also been limitations due to questions about general perception of product placements in movies and television shows. As a suggestion for a future research could be assessing consumer attitudes about product placements and purchasing intentions when the media platform is different.

References

Akdoğan, M., and Başar, A.
2015
"Covert Marketing Strategy and Techniques", Procedia - Social and Behavioral Sciences, 207, 135-148.

Avery, R.J., and Ferraro, R.
2000
"Verisimilitude or advertising? Brand appearances on prime-time television", Journal of Consumer Affairs, 34, 217–245.

Brennan, I., and Babin L.A.
2004
"Brand Placement Recognition. The Influence of Presentation Mode and Brand Familiarity", Journal of Promotion Management, 10 (1-2), 185-202.

Bressoud, E., and Lehu J.
2008
"Product placement in movies: questioning the effectiveness according to the spectator's", New Trends in Advertising Research, F. Costa Pereira, J. Veríssimo & P. Neijens (Eds.), 145-163.

Bressoud, E., Lehu, J. Russell, and Cristel A.
2010
"The Product Well Placed: The Relative Impact of Placement and Audience Characteristics on Placement Recall", Journal of Advertising Research, 50(4), 374-385.

Calfee, J., and Debra, R.
1994
"The Seventy Percent Majority: Enduring Consumer Beliefs about Advertising", Journal of Public Policy & Marketing, 13, 228–38.

Romanian Advertising Council (RAC)
"Code of Practice in Commercial Communication",art.24,available on http://membrii.rac.ro/cod.

D'Astous, A., and Chartier, F.
2000
"A Study of Factors Affecting Consumer Evaluations and Memory of Product Placements in Movies", Journal of Current Issues & Research in Advertising , 22(2), 31-40.

De Gregorio, F., and Sung, Y.
2010
"Understanding attitudes toward and behaviors in response to product placement" , Journal of Advertising, 9(1), 83-96.

Delorme, D.E., and Reid, L.N.
1999
"Moviegoers' Experiences and Interpretations of Brands in Films Revisited", Journal of Advertising , 28, 71-95.

Gaille, B.
2017
"46 Product Placement in Movies Statistics" , available on https://brandongaille.com/46-product-placement-in-movies-statistics/

Guennemann, F., and Cho., Y.C.
2014
"The Effectiveness Of Product Placement By Media Types: Impact Of Image And Intention To Purchase" , Journal of Service Science, 7(1).
Gupta, P.,B., and Gould, S.,J.
1997
"Consumers' Perceptions of the Ethics and Acceptability of Product Placements in Movies: Product Category and Individual Differences" , Journal of Current Issues & Research in Advertising , 19(1), 37-50.
Gürses, Ö.,A., and Okan, E.,Y.
2013
"Effectiveness of Product Placement: An Experimental Study in Turkey", Canadian Social Science, 10(1),56-63.
Hackley, C., Tiwsakul, R.,A., and Preuss, L.
2008
"An ethical evaluation of product placement: A deceptive practice?" , Business Ethics: a European Review, 17(2), 109-120.
Homer, P.M.
2009
"PRODUCT PLACEMENTS - The Impact of Placement Type and Repetition on Attitude" , Journal of Advertising , 38(3), 21–31.
Kahle ,L.,R., and Homer, P.M.
1985
"Physical Attractiveness of the Celebrity Endorser: A Social Adaptation Perspective", Journal of Consumer Research, 11(4), 954-961.
Kaikati, A.,M., and Kaikati, J.G.
2004
"Stealth marketing: how to reach consumers surreptitiously ". California Management Review, 46(4), 6-22.
Kit, L.C., and P'ng, E.L.
2014
"The Effectiveness of Product Placement: The Influence of Product Placement towards Consumer Behavior of the Millennial Generation", International Journal of Social Science and Humanity, 4(2), 138-142.
Kwon, E., and Jung, J.H.
2013
"Product Placement in TV Shows: The Effect of Consumer Socialization Agents on Product Placement Attitude and Purchase Intention." Online Journal of Communication and Media Technologies , 3(4), 88-106.
Law no. 504/2002. "The Audiovisual Law, Art.31", published in the Official Monitor no. 534 of 22 July 2002.
Martin, K.,D., and Smith., N.,C.
2008
"Commercializing social interaction: The ethics of stealth marketing" , Journal of Public Policy & Marketing, 27(1), 45-56.
Moore, J.
2017
"Case Study On How Movie Product Placement Sells A Brand " , available on https://blog.hollywoodbranded.com/case-study-on-how-movie-product-placement-sells-a-brand
Morton, C.,R., and Friedman, M.,A.
2002
"I Saw it in the Movies: Exploring the Link between Product Placement Beliefs and Reported Usage Behavior", Journal of Current Issues & Research in Advertising, 24(2), 33-40.
Muda, M., Musa, R., Mohamed, R.,N.,
2014
"Celebrity Entrepreneur Endorsement and Advertising Effectiveness" ,Procedia - Social and Behavioral Sciences, 130,11-20 .
Muzellec, L., Kanitz, C., and Lynn, T.
2013
"Fancy a coffee with Friends in 'Central Perk'? Reverse product placement, fictional brands, and purchase intention." , International Journal of Advertising, 32(3), 399-417.

Nagar, K.
2016
"Consumer Response to Brand Placement in Movies: Investigating the Brand-Event Fit", VIKALPA-The Journal for Decision Makers, 41(2), 149–167.
Nelson, M.R.
2002
"Recall of Brand Placements in Computer/ Video Games" , Journal of Advertising Research, 42(2), 80–92.
Nelson, M.,R., and McLeod, L.,E.
2005
"Adolescent brand consciousness and product placements: awareness, liking and perceived effects on self and others." International Journal of Consumer Studies , pp. 515–528.
Obermiller, C., and MacLachlan, D.,L.
2005
"Ad Skepticism: The Consequences of Disbelief ", Journal of Advertising, 34(3),7–18.
Petty, R.,D., and Andrews, J.,C.
2008
"Covert marketing unmasked: A legal and regulatory guide for practices that mask marketing messages" , Journal of Public Policy & Marketing, 2(1), 7-18.
Roy, A., and Chattopadhyay, S.,P.
2010
"Stealth marketing as a strategy" , Business Horizons, 53(1), 69-79.
Shrum, L.,J., Lowrey, T.,M., and Yuping, L.
2009
"Emerging Issues in Advertising Research." , The SAGE Handbook of Media Processes and Effects, eds. M. B. Oliver and R. Nabi, Thousand Oaks, CA: Sage Publications, 299-312.
Sivak, M., and Schoettle, B.
2016
"Recent Decreases in the Proportion of Persons with a Driver's License across All Age Groups", The University of Michigan Sustainable Worldwide Transportation, available on http://www.umich.edu/~umtriswt/PDF/UMTRI-2016-4_Abstract_English.pdf
Soba, M., and Müfit, A.
2013
"Product Placement Efficiency in Marketing Communication Strategy" , International Journal of Business and Management, 8(12), 111-116
Stamford, C.
2018
"Global Branded Entertainment Revenues Up 8% to $106B in 2017, Fueled by 9th Consecutive Year of Double-Digit Growth in Product Placement and Consumer Content Marketing", available on http://www.prweb.com/releases/2018/03/prweb15373577.htm
Starcom.
2017
"InfluenceMe: A 360 Perspective on Romanian Influencers", available on https://www.iqads.ro/articol/39778/starcom-romania-cu-sprijinul-global-records-lanseaza-editia-a-iv-a-studiului-si .
Stephen, A.,T. and Coote, L.,V.
2005
"Brands in Action: The Role of Brand Placements in Building Consumer-Brand Identification" , American Marketing Association Winter Educators' Conference Proceedings , 16 -28.
Sung, Y. , Choi, J., and de'Gregorio, F.
2008
"Brand Placements in Korean Films, 1995–2003: A Content Analysis, Journal of International Consumer Marketing" , 20(3-4) ,39-53
Taejun, D.,L, Sung, Y., and Choi, S.,M .
2011
"Young adults' responses to product placement in movies and television shows. A comparative study of the United States and South Korea" , International Journal of Advertising , 30(3), 479-507.
Williams, K. , Petrosky, A. , Hernandez, E., and Page, R.
2011
"Product placements effectiveness: revisited and renewed" , Journal of Management and Marketing Research , 1-24.

RESEARCHES REGARDING THE PERCEPTION OF STUDENTS AND PROFESSORS CONCERNING THE FIELD OF "ENGINEERING"

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Abstract

Purpose – It is to identify the perception of the three actors: students as future engineers, professors as staff preparing the future engineers and companies to hire future engineers, about the "Engineering" field in order to attract students with real potential to become good engineers.

Methodology/approach – The survey was used as a method, and three categories of questionnaires were created as tools: first for students, second for professors, and third for companies representatives participating in the events organized by the project "Specialists for Satu Mare".

Findings – The "Engineering" domain is a field in demand in the labor market, enjoying the trust of both students, teaching staff in the field and employers, and at the end of the paper several recommendations have been formulated to improve the training and selection of future engineers.

Research limitations/implications – The obtained results reflect in the best way the local situation, which can vary from one branch to another within the university given that the subjects among the students and the companies will be different.

Practical implications – It is intended to apply these recommendations to the branch.

Originality/value – The research is an innovative one within the TUC-N branch from Satu Mare considering that the project was the first of its kind.

Key words: "Engineering" field, *higher education*, students, teaching staff.

Introduction to the "Engineering" field

Engineering is a great profession, is the fascination to see how a fiction of the imagination transforms with the help of science into a plan on paper, then materializing in stone, metal or energy. Then create jobs and homes for people, then increase the standard of living and increase comfort. This is the high privilege of the engineer. These words can be stated about "Engineering" if we paraphrase after Clarck Hoover, US President during 1929-1933. (http://stiintasiinginerie.ro/conferinta/scurt-istoric.html)

Therefore, the progress of engineering is the main driving force of progress in the modern society and engineers can be considered the creators of material goods that have brought the comfort of every citizen of the world. Mobile phones, video cameras, GPS, airplanes, etc.from nowadays would have remained at the stage of science fiction if there was not that person called engineer, a person endowed with the ability to transfer an idea into a device capable of satisfying certain human needs. (http://www.creding.ro/doc/inginerii%20creatorii %20civilizatiei.pdf)

That's why the need for handy engineers is great both in the world and in Romania. Although in Romania there is an "air like" need for engineers, the lack of the ability of companies to offer salaries to specialists according to training and expectations has led to their migration to other countries, which is seen in the weak evolution in most Romanian fields. (https://www.digi24.ro/stiri/actualitate/educatie /ce-sa-faci-sa-devii-inginer-699158) It is estimated that over the past 27 years, two hundred thousand

engineers have left Romania. (http://stiri.tvr.ro/romania-exporta--dupa-revolu--ie--200-de-mii-de-ingineri-au-plecat-sa-lucreze-in-strainatate_822714.html#view)

The importance of engineering from another perspective has to be emphasized, the first three positions that contributed to the structure of Romania's GDP in 2011 were engineering domains: industry (26 percent), agriculture (12.4 percent), construction (8 percent). (www.creding.ro/doc/Meseria%20de%20inginer.pptx)

Even though engineering is a profession that can be built through gradual training with disciplines developed in a coherent logical sequence (http://www.agir.ro/buletine/2584.pdf) and a job requested by 90 percent of employers (http://stiri.tvr.ro/cea-mai-ceruta-profesie--90prc--dintre-angajatori-ii-cauta_45176.html#view), it is not everyone's reach to follow it because it is a hard field. Proof of this is the large losses (unfinished or abandoned), the percentage of student graduation at the end of 2014/2015 being 78.2 percent for the Engineering, Processing and Construction specialty group. For the other groups the percentage of graduation is between 83.1 percent and 93.1 percent, according to the Report on the state of higher education in Romania, 2016. (https://www.edu.ro/sites/default/files/_fi%C8%99iere/Minister/2017/transparenta/Stare_sup%20%202016.pdf)

In spite of the good theoretical education they receive in the faculties of traditional universities, it is a general one, which is just a basis for companies to "build" their employees. For this reason, in addition to traditional training programs, some companies continue to send their employees from certain positions to further education. Approximately 37,000 people are enrolled in master classes in engineering and over 5,000 Romanians want to receive PhD in engineering. (http://tbs.ro/?p=7453)

In the fundamental field of Engineering sciences, in the branch of science Mechanical engineering, mechatronics, industrial engineering and management there are 32 license fields, each with more specializations (a total of 170 specializations in the branch of science) and in the branch of science Systems engineering, computers and information technology are 2 license fields with 7 specializations in the branch of science, according to the decision no. 140/2017 concerning the approving of the Nomenclature of domains and specializations / programs of university studies and the structure of higher education institutions for the academic year 2017-2018. (https://cmu-edu.eu/wp-content/uploads/2017/05/Hotarare-140-2017.pdf)

Of these, at the Satu Mare Extension of the Technical University of Cluj-Napoca there are three specializations in the fundamental field of Engineering Sciences, as follows:

- in the branch of science Mechanical engineering, mechatronics, industrial engineering and management:
  - *Industrial Economic Engineering* – in the license field, Engineering and Management;
  - *Machine Building Technology* – in the license field, Industrial Engineering;
- in the branch of science Engineering Systems, Computers and Information Technology:
  - *Automation and Applied Informatics* – in the license field, System Engineering.

Results of the research

86 percent of the students attending the 3 specializations in the "Engineering" field consider that the following specialization offers them real chances of achievement giving the rating much and very much (Figure 1).

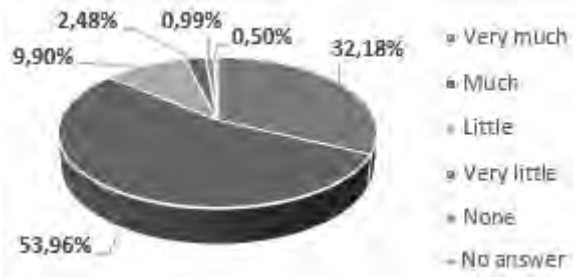


Figure 1. Students' questionnaire - To what extent do you think you have real chances in the future through your specialization?

The confidence shown towards the importance of the "Engineering" field is also reflected by the results obtained in the next question (Figure 2). Almost 77 percent of the surveyed students would follow the same specialization if they were in a position to choose again, to a high, very high or extremely high extent.

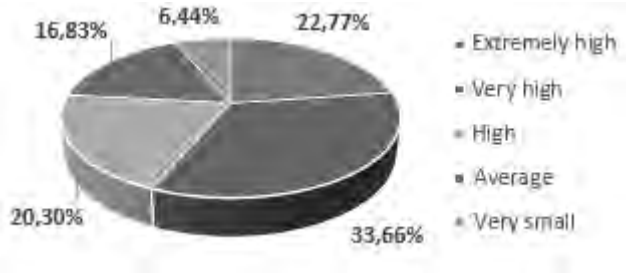


Figure 2. Students' questionnaire - How do you appreciate the extent to which, if you should take it from the beginning, would you follow the same specialization?

Also, 86 percent of the students are satisfied with the preparation for the daily life offered by the specialization followed, giving the rating good, very good or excellent (Figure 3).

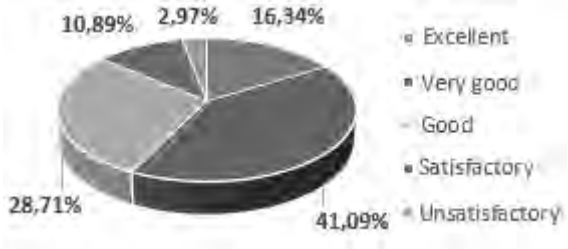


Figure 3. Students' questionnaire - How do you generally appreciate the training provided by the specialization you follow for everyday life?

Next we addressed to the students two more open-ended questions to determine exactly what made them choose the engineer profession. For the interpretation of the results, the responses were grouped into six groups (G1-G6) for the first question (Figure 4) and twelve groups (G1-G12) for the second question (Figure 5). One respondent could mention several aspects, therefore the answer could fit into several groups.

Thus, the first three reasons that led to the choice of the engineer profession were: "profession for the future" (37.6 percent), "own pleasure" (26.2 percent) and "specialization in the field" (14.3 percent).

G1: profession for the future;
G2: own pleasure;
G3: challenges;
G4: specialization in the field;
G5: advice/model to follow;
G6: social rank.

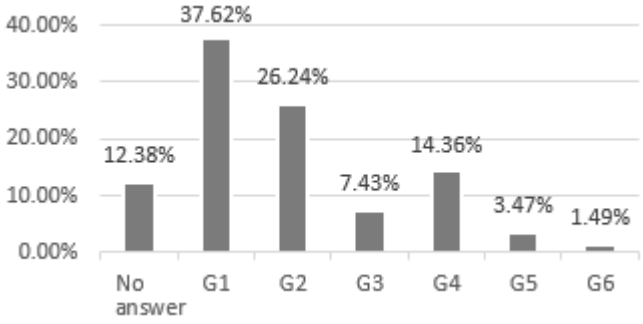


Figure 4. Students' questionnaire - What was the reason you chose to become an engineer?

They believe that they are "compatible" with the field of "Engineering" and can practice as engineers because they have qualities that recommend them, the most important in their opinion being: "perseverance/determination" (26.7 percent), "cognitive intelligence" (24.2 percent), "meticulosity" (22.7 percent) and "creativity" (15.3 percent).

G1: cognitive intelligence;
G2: management/ organization;
G3: perseverance/ determination;
G4: communication/ cooperation;
G5: rightness;
G6: creativity;
G7: meticulosity;
G8: punctuality;
G9: professionalism;
G10: responsibility;
G11: curiosity;
G12: adaptation.

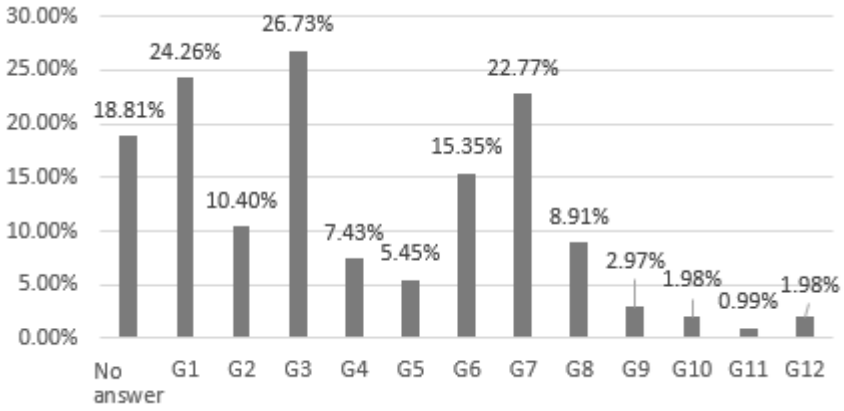
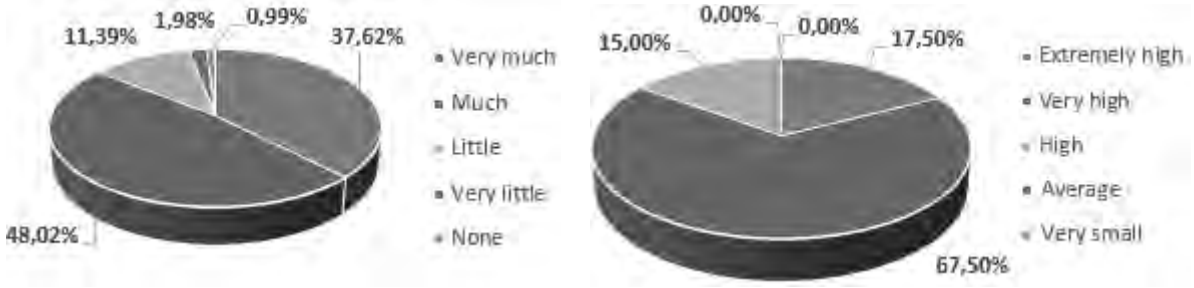


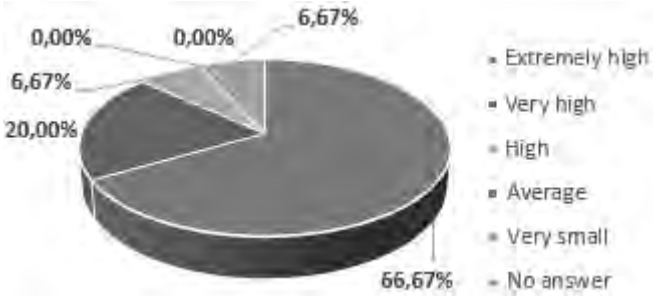
Figure 5. Students' questionnaire - What qualities do you consider it recommend you as a person for the engineering profession?

More than 85% of the students consider that the Satu Mare labor market needs specialists in the "Engineering" field, giving the rating much and very much (Figure 6a).



a). Students' questionnaire

b). Professors' questionnaire



c). Companies representatives' questionnaire

Figure 6. To what extent do you think that the Satu Mare labor market needs specialists in "Engineering" field?

To the same question, all the professors (100 percent) (Figure 6b) and 93.3 percent of the representatives of the participating companies (Figure 6c) responded that the Satu Mare labor market needs specialists in the field of "Engineering" by using the rating high, very high or extremely high. It should be noted that about 6.7 percent of the representatives of the companies did not provide an answer.

In order to identify the job-seeking specializations in Satu Mare companies, we asked the participating companies to submit concrete job offers for students, given that the largest companies in the region were invited, no matter the domain they work. It can be seen that the jobs refer, to an overwhelming extent, to specializations that fall within the field of "Engineering" even if, for example, the graduates of the Industrial Economic Engineering specialization have a wide openness, being able to find jobs in various fields (Figure 7).

V1 = machine building technology;
V2 = industrial economic engineering (management, quality, logistics, etc.);
V3 = automation and applied informatics;
V4 = computers;
V5 = electronics and telecommunications;
V6 = electrical engineering;
V7 = other:
"human resources"

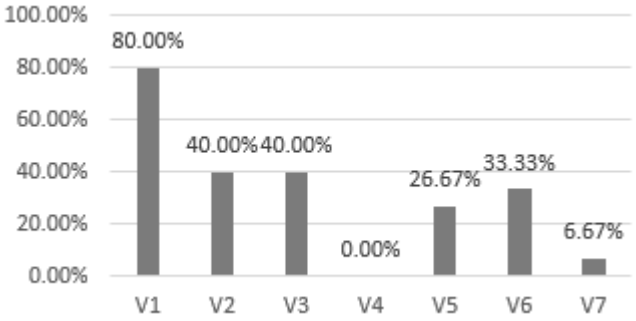
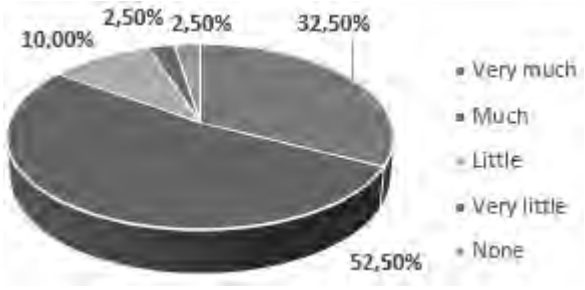
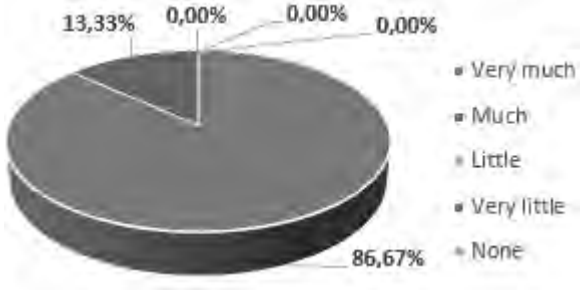


Figure 7. Companies representatives' questionnaire - In which specialization/specializations are the jobs from the offer of the company you represent?

85 percent of the professors (Figure 8a) and 100 percent of the companies' representatives (Figure 8b) appreciate that the technical university through its branch must be involved much and very much in the economic and/or social issues of the region.



a). Professors' questionnaire



b). Companies representatives' questionnaire

Figure 8. How much should university / TUC-N branch from Satu Mare involve in economic and/or social issues in the region?

In order to facilitate the involvement of the technical university in the region's problems, the companies consider that they can engage in supporting and developing the technical higher education in Satu Mare (Figure 9), firstly by: "practice offer" (26.7 percent), "employment offer" (13.3 percent) and "sponsorship" (13.3 percent).

G1: practice offer;
G2: employment offer;
G3: sponsorship;
G4: the endowment of the university's laboratories;
G5: voluntary support from companies;
G6: university involvement in company projects (courses);
G7: joint programs;
G8: by making available the equipment, compartment within the company.

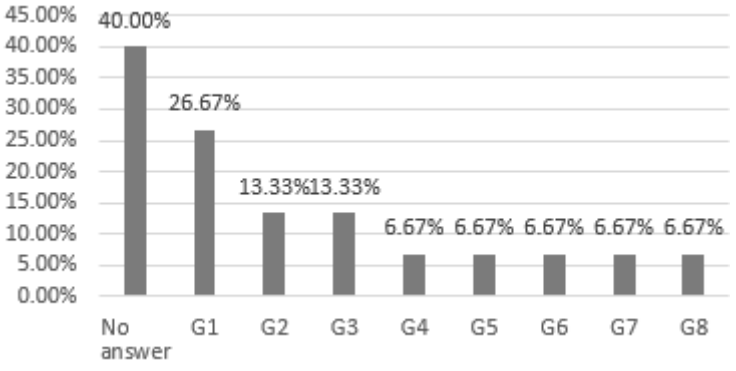


Figure 9. Companies representatives' questionnaire - How do you think companies can get involved in supporting and developing technical higher education from Satu Mare?

In order to be able to select the category of students with technical skills to follow a technical higher education specialization, the professors consider that the best way to select is to introduce the "preliminary examination" (32.5%), followed by "competitions with technical profile" and "technical aptitude tests", each with 20% (Figure 10).

G1: preliminary examination;
G2: competitions with technical profile;
G3: technical aptitude tests;
G4: other:
"By conducting logical tests, interviews, monitoring results at technical-scientific olympiads and motivating students to study in Romania, increasing motivation".

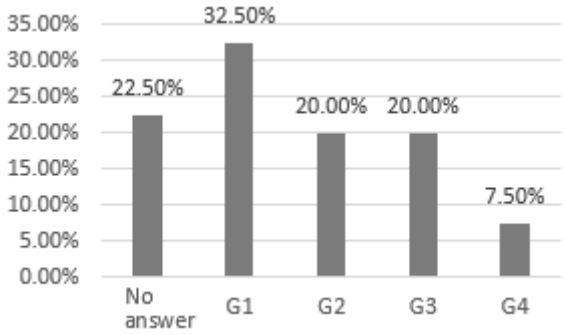


Figure 10. Professors' questionnaire - How do you think that the category of students with technical skills can be selected to follow a technical higher education specialization?

And in order to increase the chances of the high school graduate to be more easily adapted to the requirements of the technical higher education system, professors believe that in high school, more emphasis should be placed on "basic knowledge - mathematics/physics/ chemistry" (30 percent) , should be a better "promotion/popularization of engineering" (17.5 percent), etc. (Figure 11).

G1: basic knowledge - mathematics/physics/ chemistry;
G2: preliminary examination from fundamental disciplines/ baccalaureate from physics and mathematics;
G3: promotion/popularization of engineering;
G4: seriousness;
G5: other suggestions:
"enhancement of practical activities, hours with advisory nature introduced in curriculum, etc."

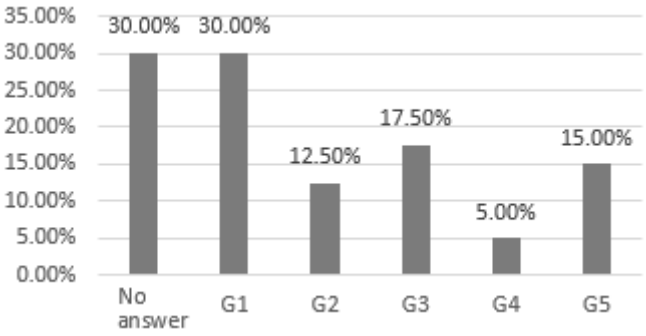


Figura 11. Professors' questionnaire - How do you think the chances of a high school graduate can be increased to make it easier to adapt to the requirements of the technical higher education system?

The questions from Figure 9, Figure 10 and Figure 11 were open-ended that's why, for interpretation of the results, the answers were grouped into eight groups (G1-G8) for the first question (Figure 9), 4 groups (G1- G4) for the second question (Figure 10) and five groups (G1-G5) for the third question (Figure 11). One respondent could mention several aspects, therefore the answer could fit into several groups.

Conclusions and recommendations

As a result of the research, we can state that the domain of "Engineering", or in other words, the fundamental field of Engineering Sciences, with the related branches of science and specializations according to the names from the "Nomenclature of domains and specializations/programs of university studies for the academic year 2017-2018", is a field in demand in the labor market, enjoying the trust of both students, specialists in the field and employers:

- more than 85 percent of the students, 100 percent of the professors and 93.3 percent of the representatives of the participating companies agreed that the Satu Mare labor market needs specialists in the "Engineering" field, which was also confirmed by the job offers for the technical specializations brought by the companies that came;
- 86 percent of the students attending the 3 specializations in the "Engineering" field consider that the followed specialization offers real life chances and almost 77 percent of the students surveyed would follow the same specialization if they were to choose again. Also, 86 percent of students are satisfied with the preparation for the daily life offered by the specialization followed;

- the main reason the students chose the profession of engineer was that they considered it a "job of the future" (37.6 percent) and others wanted a "specialization in the field" (14.3 percent).
- 85 percent of the professors and 100 percent of the representatives of the companies appreciate that the technical university through its branch must be involved in the economic and/or social issues of the region, and for this the companies are willing to engage in supporting and developing of the technical higher education from Satu Mare, first of all through "practice offer" (26.7 percent), "employment offer " (13.3 percent) and "sponsorship" (13.3 percent).

Also it could be possible to create a portrait of the person "compatible" with the field of "Engineering", a portrait realized through the perspective of students attending technical specializations. In their opinion, the main qualities required for an engineer would be: "perseverance/determination" (26.7 percent), "cognitive intelligence" (24.2 percent), "meticulosity" (22.7 percent) and "creativity" (15.3 percent).

Several recommendations can be made to improve the training and selection of the future engineers, the labor force of the "Engineering" domain:

- a better collaboration between teaching staff from university and companies representatives to identify current market needs and develop students' competencies to meet these needs through disciplines taught, including financial support from companies for endowing laboratories;
- to attract more skilled candidates to technical specializations in order to obtain valuable engineers, it would be necessary:
    - selection based on preliminary examination, technical aptitude tests or competitions with technical profile, of students with technical skills to follow a specialization in technical higher education;
    - preparing high school students to rely more on basic knowledge from math, physical and chemistry to increase the chances of high school graduates to adapt more easily to the requirements of the technical higher education system.

Acknowledgements

This paper focuses on the results obtained from the implementation of the project "*Specialists for Satu Mare*" funded by the Satu Mare Local Council through the "G.M. Zamfirescu" Cultural Centre of Satu Mare, and the Technical University of Cluj-Napoca, contract No. 3/444/11.04.2016, project manager: Șef lucr.dr.ing. Călin Ciprian Oțel. We take this opportunity to thank all parties involved in the implementation of the project.

References

Andronescu, E.,
Meseria de inginer. Evoluție, perspective și soluții pentru viitor, Universitatea Politehnica București, www.creding.ro/doc/Meseria%20de%20inginer.pptx, accessed at 26.01.2018
Bejan, M.,
2016
Scurt istoric, A XVI-a Conferinţă internaţională multidisciplinară „Profesorul Dorin PAVEL – fondatorul hidroenergeticii româneşti", Sebeş, 2016, http://stiintasiinginerie.ro/conferinta/scurt-istoric.html, accessed at 25.01.2018
JINESCU, V.V.,
Inginerii - creatorii civilizației contemporane,
http://www.creding.ro/doc/inginerii%20creatorii%20civilizatiei.pdf, accessed at 27.01.2018
Vida-Simiti, I., Şerban, V.A., and Resiga, R.,
Adaptarea nomenclatorului de domenii şi specializări inginereşti la cerinţele şi dinamica pieţei muncii, Lucrările celei de-a X-a ediţii a Conferinţei anuale a ASTR, 2015, http://www.agir.ro/buletine/2584.pdf, accessed at 26.01.2018
*** Digi24, Ce să faci să devii inginer?, 02.04.2017, https://www.digi24.ro/stiri/actualitate/educatie/ce-sa-faci-sa-devii-inginer-699158, accessed at 25.01.2018

*** Hotărârea nr. 140/2017 privind aprobarea Nomenclatorului domeniilor și al specializărilor/programelor de studii universitare și a structurii instituțiilor de învățământ superior pentru anul universitar 2017-2018, https://cmu-edu.eu/wp-content/uploads/2017/05/Hotarare-140-2017.pdf, accessed at 27.01.2018
*** Ministerul Educației Naționale, Raport privind starea învățământului superior în România, 2016, https://www.edu.ro/sites/default/files/_fi%C8%99iere/Minister/2017/transparenta/Stare_sup%20%202016.pdf, accessed at 26.01.2018
*** STIRI.TVR.RO, Cea mai cerută profesie. 90% dintre angajatori îi caută, 27 Mai 2014, http://stiri.tvr.ro/cea-mai-ceruta-profesie--90prc--dintre-angajatori-ii-cauta_45176.html#view, accessed at 27.01.2018
*** STIRI.TVR.RO, România "exportă". După Revoluție, 200 de mii de ingineri au plecat să lucreze în străinătate, 25 Septembrie 2017, http://stiri.tvr.ro/romania-exporta--dupa-revolu--ie--200-de-mii-de-ingineri-au-plecat-sa-lucreze-in-strainatate_822714.html#view, accessed at 27.01.2018
*** Total Business Solutions, http://tbs.ro/?p=7453 apud Mirea, C., România are 130.000 de masteranzi şi 23.000 de doctoranzi, Ziarul Financiar, 05 noiembrie 2012, http://www.zf.ro/profesii/romania-are-130-000-de-masteranzi-si-23-000-de-doctoranzi-cat-de-angajabili-sunt-cei-care-isi-trec-in-cv-aceste-titluri-10272477, accessed at 25.01.2018

APPLICATION FOR CERTIFICATION AS A SOCIAL ENTERPRISE IN ROMANIA: ASSESSMENT OF THE ADMINISTRATIVE PROCESS

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Abstract

Purpose *– The paper aims to assess the administrative process regarding the issuance of the social enterprise certificate.*

Methodology *– A survey was used as a quantitative research method, with its research tool - the questionnaire. The target group was made up of representatives of 96 certified social enterprises from Romania with a response rate of 34.04%.*

Findings *– The results show that most of respondents are satisfied with the administrative process of getting the social enterprise certificate*

Research limitations/implications *– The Romanian social economy is only in the introduction phase of its life cycle. A friendly environment that encourages sustainable development of the social economy requires an active involvement of stakeholders and policy makers.*

Practical implications *– Study shows that most of respondents would have preferred to have access to an online platform as a mean to send their documentation. Moreover, social economy should be encouraged through sound public policies that would allow sustainable development of social enterprises.*

Originality/value *– Our survey, although representative for the certified Romanian social enterprises participating in the study, has a limited validity given the fact that the administrative process of obtaining the social certificate can be subject to change and the population of research is more likely to increase in the future.*

Key words: *social enterprise certificate, social economy, sustainable social enterprise.*

Introduction

For a long time, in Romania, the concepts of social economy and social enterprise were not defined in legal or policy terms leading to confusion among general population (European Commission, 2014a).

In a society that needs to respond to increasingly complex challenges, the emergence of social economy structures is very important for the success of the Europe 2020 Strategy due to their contribution to intelligent growth that responds to social needs (Barna, 2014).

Our research subject is to assess of the administrative process regarding the issuance of social enterprise certificate with the aim to provide improvement measures to support the development of Romanian social economy.

Theoretical background

The concepts of social economy and social enterprise

Social economy represents a solution identified to solve social problems at European Union and global level. It defines a group of organizations among the most recognized are the cooperatives, associations, foundations and credit union. Essentially, they aim to achieve social objectives and they are defined by participative governance (Petrescu, 2013).

Adaptation of nongovernmental sector to market economy led to development of social enterprises. These entities embed a social and economic dimension (Bercea, Bacali and Lakatos, 2016). The social enterprise is an operator within the social economy (SE) which has a social mission. It involves in activities its stakeholders (European Commission, 2014b, European Commission, 2018).

Social enterprises differ from other types of organizations through the following aspects:

- Their mission is to create social value than to generate profit (Lettieri, Borga and Savoldelli, 2004);
- Their goods and services are dedicated especially for vulnerable groups (Cardoso, Meireles and Ferreira Peralta, 2012);
- They use business like approaches to create social value (Talbot, Tregilgas and Harrison, 2002);
- They are financed through a mix of grants and self-financing operations (Luke and Chu, 2013);
- They use the attributes of the human capital as a source of innovation and strategic renewal (Bontis, 1998);
- The profit is reinvested for the achievement of social objectives (Dobrai and Farkas, 2008).

Legislation on social economy

The Law 219/15 on the SE was adopted by Romanian Parliament in July 2015 following Methodological Norms for applying the Social Economy Law adopted by Government Decision in August 2016. It defines the SE as "all activities organized independently of the public sector, whose purpose is to serve the general interest, the interests of a non-patrimonial community and / or personal interests, by increasing the employment of the vulnerable group and / or the production and the supply of goods, the provision of services and / or workmanship " (Law no. 219/2015 of Social Economy). Vulnerable group can mean (Methodological Norms for applying the Law of the Social Economy, 2016): (1) individuals in the child protection system, (2) individuals from families receiving social assistance, (3) individuals who are part of families benefiting from family support allowances, (4) asylum seekers or beneficiaries of international protection, (5) homeless people and (6) individuals at risk of losing their ability to meet their daily living needs.

The SE principles resulting from the Law refers to (Law no. 219/2015 of Social Economy): (1) priority given to the individual and social objectives instead of profit growth; (2) Solidarity and collective responsibility; (3) Convergence between the interests of the associated members and the general interest and / or the interests of some communities; (4) Democratic control of the members, exercised over the activities carried out; (5) voluntary and free association in organizational forms specific to the field of social economy; (6) distinct legal personality, autonomy of management and independence from public authorities; (7) Allocation of the major part of the financial profit / surplus to achieve the objectives of general interest, of a community or in the non-patrimonial interest of the members.

The social enterprise certificate can be obtained by those entities which demonstrate by documents respect for the principles and the criteria laid down by the law (Law no. 219/2015 of Social Economy, (Methodological Norms for applying the Law of the Social Economy, 2016). The process is presented schematically in the chart below.

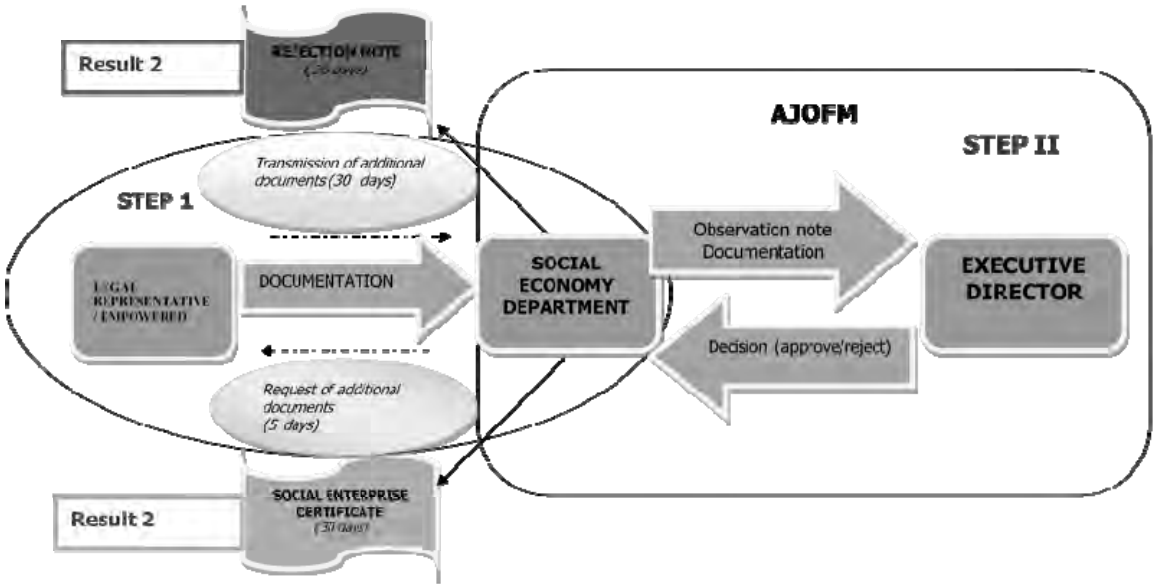

Figure 1. Administrative process of obtaining the social enterprise certificate

The legal representative of the enterprise compiles the documentation required by law following the Methodological Norms for applying the SE Law and he sends it to SE Department within the County Agency for Employment. The public officers within the SE Department analyze the documentation and, if necessary, within 5 days they request additional documents. The legal representative of the enterprise has 30 days to prepare and send the requested additional documents. Subsequently, the public officer sends an observation note and the complete documentation to the executive director for the final decision. Within 30 days, after the submission of the complete documentation the legal representative of the social enterprise will receive the social enterprise certificate or a rejection note in case they could not provide enough information to prove they comply with the principles of social economy.Evidence of social enterprises and social enterprises of insertion is realized with the help of the Unique Registry of Evidence of Social Enterprise administered by the National Agency for Employment (ANOFM). A social enterprise can be recognized as social enterprise of insertion if two conditions are met (Law no. 219/2015 of Social Economy): (1) At least 30% of the staff employed is part of the vulnerable group (the working time of these employees will represent at least 30% of the working time of all employees), (2) it aims at combating exclusion, discrimination and unemployment through the socio-professional insertion of disadvantaged people.The social mark can be obtained at the same time with the social enterprise certificate or afterwards.

Assessment of the administrative process – a quantitative research

The general objective of the research was to assess the administrative process of obtaining the social enterprise certificate. The specific research objectives are to (1) identify the factors that influence the satisfaction of the applicants regarding the process of obtaining the social enterprise certificate; (2) to identify the preferred means of communication in the process of certification and monitoring the activity of social enterprises; (3) to identify the difficulties encountered by applicants in the process of certification; (4) to identify the benefits of certification.

Methodology of research

As a research method was used a survey, a quantitative method that facilitates the confirmation or refutation of existing theories, with its research tool - the questionnaire. The target group is made up of representatives of certified social enterprises from Romania. The questionnaire was sent by e-mail to all 96 representatives of social enterprises registered in the Unique Registry of Evidence of Social Enterprise, published monthly by the ANOFM. We obtained a response rate of 34.04%.

The following research hypotheses were formulated:

H1: Satisfaction of beneficiaries with the certification process of social enterprises depends on the conduct of civil servants;

H2: Satisfaction of beneficiaries regarding the certification process of the social enterprises depends on the difficulty of drawing up the certification documentation;

H3: Satisfaction of beneficiaries with the certification process of social enterprises depends on the waiting time for obtaining the certificate.

H4: Satisfaction of beneficiaries regarding the certification process of social enterprises depends on the costs incurred in obtaining the certificate.

H5: Most respondents would prefer an interactive platform as a mean of transmitting documents.

Results of the research

Most of certified social enterprises are organized in the form of NGOs, namely 60% are associations, 6.67% are foundations, 6.67% are cooperatives and 3.33% are mutual aids associations. The remaining 23.33% of social enterprises are organized as limited liability companies.

Most of certified social enterprises (30%) from the research sample activate in the field of social services followed by those in the field of crafting (13.33%), education and training (13.33%), environmental protection (10%) and, banking and insurance (3.33%).

The rest of 30% are social enterprises within other fields of activity. Moreover, most of representatives of the certified Romanian social enterprises are satisfied (21.88%) or very satisfied (37.5%) regarding the certification process. To continue with the research, the conduct of public servants within the Department of Social Economy was assessed in three different situations: on the phone, face to face and via email.

Table 1: The conduct of public servants within the Department of Social

Situations/ conduct	Arrogant	Cold-livered/ Dismissive	Civilized/ Polite	Very polite
On the phone	3.22%	9.67%	32.27%	54.84%
Face to face	3.45%	3.45%	31.03%	62.07%
Via email	4.35%	13.05%	52.17%	30.43%

Generally, most of respondents describe the *conduct of public servants* within Department of Social Economy as being very polite, but their conduct is perceived more polite when the two parties communicate face to face.Regarding the *difficulty of drawing up the documentation* and the clarifications (when necessary) to obtain the social enterprise certificate, the respondents assessed these two procedures as easy or very easy. Only in 37% of the cases there were no clarifications regarding the documentation.

Table 2: Difficulty of drawing up the documentation for certification

Assessment/ Situations	**Documentation**	**Clarifications**
Very difficult	3.12%	6.3%
Difficult	15.62%	9.4%
Neither difficult, nor easy	21.88%	15.6%
Easy	43.75%	21.9%
Very easy	15.63%	9.4%
Not necessary	-	37,5%

The majority of respondents personally filed the documentation (87.5%), while the other 12.5% send it by mail. Over 50% of the respondents would have preferred to have access to an online platform as a mean to send their documentation. Otherwise, the costs with the administrative process are perceived as being low (43.75%) or very low (34.38%).The advantages of obtaining the social enterprise certificate were assessed on a Likert scale from 1 to 5 possible according to the following table.

Table 3: Advantages of certification

Advantages of social enterprise certification	**Mean**
Access to non-refundable financing	3.19
Image improvement	2.41
Increases visibility	2.22
Benefits from public authorities	2.16
Financial sustainability	1.94

Unfortunately, the respondents do not perceive any major advantages that arise from the social enterprise certification except access to non-refundable financing in form of European or national funds indicating the need of sound public policies to encourage sustainable development of social enterprises.

In order to test the first four hypotheses, we used the stepwise linear multiple regression analysis which is a combination of the forward and backward selection techniques (NCSS Statistical Software, 2017, (Landau and Everitt, 2004). Variables are added following a backward elimination process which is carried out after each inclusion step in order to remove variables that are no longer appraised to improve the model (Landau and Everitt, 2004).

Table 4: Variables Entered/Removeda

Variables Entered	Variables Removed	Method
6.How do you appreciate the waiting time for obtaining the social enterprise certificate?	.	Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100).

a. Dependent Variable: 1. On a scale of 1 to 5, where 1 means "to a very small extent" and 5 means "to a very large extent", to what extent are you satisfied with the process of obtaining the social enterprise certificate?

Table 5: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.702[a]	.493	.468	1.025

a. Predictors: (Constant), 6.How do you appreciate the waiting time for obtaining the social enterprise certificate?

According to the data presented in the table above, the value of R Square is 0.468, which tells us that 49.3% of the variance of the dependent variable is explained by the variation of the independent variables. Therefore, the satisfaction of beneficiaries regarding the certification process is explained in proportion of 49.3% by the waiting time for obtaining the social enterprise certificate.

Table 6: ANOVA[a]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	20.452	1	20.452	19.475	.000[b]
	Residual	21.003	20	1.050		
	Total	41.455	21			

a. Dependent Variable: 1. On a scale of 1 to 5, where 1 means "to a very small extent" and 5 means "to a very large extent", to what extent are you satisfied with the process of obtaining the social enterprise certificate?
b. Predictors: (Constant), 6.How do you appreciate the waiting time for obtaining the social enterprise certificate?

The significance of Anova below 0.05 indicates a significant regression model.

Table 7: Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	.492	.706		.696	.494
	6.How do you appreciate the waiting time for obtaining the social enterprise certificate?	.795	.180	.702	4.413	.000

a. Dependent Variable: 1. On a scale of 1 to 5, where 1 means "to a very small extent" and 5 means "to a very large extent", to what extent are you satisfied with the process of obtaining the social enterprise certificate?

Following the stepwise regression of the four independent variables included in the model, only the variable "waiting time for obtaining a social enterprise certificate" remained.

According to the standard Beta coefficients, there is a strong connection between the independent variable "waiting time for obtaining a social enterprise certificate" and the dependent variable "satisfaction of beneficiaries regarding the process of obtaining the social enterprises certificate" as the coefficient takes a value closer to 1 than to 0. The latter hypothesis argues that most respondents would prefer an interactive platform for transmission of the documents and it was confirmed by 53.13% of the respondents.

Conclusions and recommendations

According to our research findings, we concluded that:

1. Most of respondents are satisfied or very satisfied with the administrative process of obtaining the social enterprise certificate (59.4%);
2. The conduct of public officers within the Department of SE was considered polite or very polite by most of the beneficiaries who responded our questionnaire;
3. The process of drawing up the documentation both for certification phase (59.4%) and clarification phase (50%) were assessed by most of the respondents as easy or very easy;
4. Most of respondents transmitted the documentation personally, but would have preferred to have access to an interactive online platform that allows them to send documents both in the certification/clarification phase and monitoring process;
5. The most recognised advantage of social enterprise certification is the possibility to access non-refundable funds (48.39%);
6. The waiting time to obtain the social enterprise certificate determined the satisfaction of beneficiaries regarding the process.

Considering our research findings we recommend the creation of an interactive online platform that allows the exchange of documents between representatives of social enterprises and the public officers within the Departments of Social Economy both in the phase of certification/ clarification and monitoring process.We also recommend continuous assessment of the process to maintain a lower time waiting for obtaining the social enterprise certificate.

Not lastly, the legal framework is not enough to ensure the development of the social economy. Social economy should be encouraged through sound public policies that would allow sustainable development of social enterprises.

Acknowledgments

This work received financial support of the CENTER FOR INNOVATION AND ORGANISATIONNAL SUSTAINABILITY. “The study on the evaluation related to attestation process of social enterprises in Romania - EAPER”, Project No. 010/2017.

References

Barna, C.
2014
Atlas of Social Economy in Romania. Civil Society Development Foundation (CSDF), ISBN: 978-973-0-17000-9. Available online: http://www.fdsc.ro/library/files/atlas_of_social_ econo-my_2014_summary_en.pdf (20 April 2018).
Bercea, O.B, Bacali L., Lakatos, E.S.
2016
Public Marketing: A Strategic Tool for Social Economy. Review of Applied Socio-Economic Research.;11(1):13-21.
Cardoso, L., Meireles, A., Ferreira Peralta, C.
2012
Knowledge management and its critical factors in social economy organizations. Journal of knowledge management;16(2):267-84.

Bontis, N.
1998
Intellectual capital: an exploratory study that develops measures and models. Management decision;36(2):63-76.
Dobrai, K., Farkas, F.
2008
Knowledge-based organizations: Examining knowledge processes in public-serving nonprofit organizations. International Journal of Knowledge, Culture and Change Management; 8(2):9-22.
European Commission
2014a
A map of social enterprises and their eco-systems in Europe - Country Report: Romania. European Union. Available online: http://ec.europa.eu/social/keyDocuments.jsp? pager.offset=20&& langId=en&mode=advancedSubmit&advSearchKey=socentcntryrepts (25 April 2018).
European Commission
2014b
European Union. A map of social enterprises and their ecosystems in Europe–Executive summary. Available online:http://ec.europa.eu/social/main.jsp?langId=ro&catId=89&newsId =2149 (12 March 2018).
European Commission
2018
Available online: http://ec.europa.eu/growth/sectors/social-economy_en (20 April 2018).
Landau, S., Everitt, B.S.
2004
A handbook of statistical analyses using SPSS. Chapman & Hall/CRC.
Law no. 219/2015 of Social Economy
2015
Available online: http://www.mmuncii.ro/j33/images/Documente/Legislatie/L219-2015.pdf (15 September 2017).
Lettieri, E., Borga, F., Savoldelli, A.
2004
Knowledge management in non-profit organizations. Journal of Knowledge Management; 8 (6):16-30.
Luke, B., Chu, V.
2013
Social enterprise versus social entrepreneurship: An examination of the ‘why’and ‘how’in pursuing social change. International Small Business Journal.;31(7):764-84.
Methodological Norms for applying the Law of the Social Economy
2016
Available online: http://www.mmuncii.ro/j33/images/Documente/Munca/2016/HG_585_2016 .pdf (29 September 2017).
NCSS Statistical Software
2017
Available online: https://ncss-wpengine.netdna-ssl.com/wpcontent/themes/ncss/pdf/Proce du res/NCSS/StepwiseRegression.pdf (10 September 2017).
Petrescu, C.
2013
Economia sociala în contextul dezvoltarii locale. Iasi: Polirom..ISBN: 978-973-46-3935-9 Available online: http://www.ies.org.ro/library/files/economia_sociala_in_contextul_ dezvoltarii locale.pdf (29 April 2018).
Talbot, C., Tregilgas, P., Harrison, K.
2002
Social enterprise in Australia: an introductory handbook. Adelaide Central Mission.

ERGONOMIC CRITERIA IN THE OPTIMIZATION OF ASSEMBLY PROCESSES

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Abstract

Purpose *– The optimization of assembly processes plays a huge role in the modern economy, due to the cost and time-consuming nature of this type of production activity. Well-planned assembly operations determine the quality of the final products. Due to the fact that a significant part of the assembly process is carried out by hand, there are a number of strictly ergonomic factors that will determine the final result of the performed assembly activities.*

Methodology/approach *- Existing methods of ergonomic analysis of assembly processes was used and ways of mitigating the worker's load during assembly operations. Using analytic program sequences were determined and then performed. Every assembly sequence was assessed with ERA and Strain Index methods.*

Findings *– The proposed approach in contrast to methods based on elementary movements (MTM) or subjective methods like Strain Index, allows for fast analysis of assembly activities and facilitates their reorganization.*

Research limitations/implications *– The main limitation of this study is number of tasks, due to program limitation and possible number of sequences*

Practical implications *– Even quite simple ergonomic methods can led to determining the best assembly sequence.*

Originality/value *– This research is a part of example how to approach production problems. Proposed methodology gives practical evidence that ergonomics should be incorporated into optimization strategies of production companies*

Key words: *ergonomic design, assembly optimization,*

Introduction

The assembly process – combining elements into parts, subassemblies and assemblies – is an extremely important part of production. Correctly performed assembly operations determine a number of partial features that can be broadly defined as product quality, and consequently they also determine user satisfaction. Assembly is therefore the link between the production and the distribution of the product. The basic decision to be made regarding assembly concerns the level of its automation. Assembly performed with the use of machines has many advantages. First of all, it ensures repeatability and combines elements at high speed, provides the desired performance, and avoids errors related to the human factor (Jasiulewicz-Kaczmarek, Saniuk 2015). Unfortunately, in many cases manual assembly is the main method in which enterprises conduct manufacturing processes, mainly due to the flexibility of manual manufacturing systems. In Industry 4.0, dynamic processes facilitate making changes in production and provide the ability to respond flexibly to

disruptions (Grzybowska, Łupicka 2017). The most common reasons for utilizing manual assembly also include:

1. automation's apparent or real lack of profitability, e.g., as a result of small batch production or complicated assembly processes,
2. inability to interfere in the design of the created solution, which hinders the use of automatic assembly, as well as the inability to reorganize production processes, due to spatial, resource or legal limitations,
3. lack of proper planning of both production hall layout as well as decreased employment related to human replacement by machines,
4. lack of financial means allowing for the automation of processes, even if such actions would be financially justified,
5. lack of qualified personnel (automation specialists), thanks to whom it would be possible to carry out the automation process as well as analyze its desirability.

Most often there is an overlap of the above-mentioned factors which ultimately results in a significant part of assembly processes being carried out by hand (Hamrol, Kowalik, Kujawinska 2011). Therefore, in many companies everything that is easy to automate is subject to automated assembly – the leftover allocation strategy – all functions that can be automated should be relegated to machines, while the remaining functions should be left to the operators (Butlewski 2017). The remaining, large part of assembly operations is carried out manually. Despite the disadvantages of manual assembly, there are several advantages of such organization in production processes. Above all, an employee can quickly retool for the production of a different subassembly. The human copes with unscheduled difficulties and is able to overcome them; a machine must be specially designed with this quality in mind. In addition, elements that are joined manually are subject to continuous monitoring. The assembler is able to observe and check for errors in the units to be joined. This way, it is possible to quickly detect product defects at an early enough stage to correct them at no cost.

Manual assembly is a significant challenge for ergonomic design of production processes. Due to the high repeatability of working movements, assembly can in most cases be classified as monotonous work of one type. Biomechanical loads on employees resulting from their position during work should also be considered, as well as the fact that the repeatability of working movements results in the same body segments being exposed to loads. The purpose of this article is to present ergonomic criteria for the organization of assembly processes, on the example of the assembly of a frame support. Ergonomic assessment enables the selection of the optimal assembly sequence for the worker (in terms of loads), while ensuring the efficiency of these processes.

Ergonomic issues in assembly

The conditions of assembly work are a complex problem and require systematic and consistent cooperation between various units of the enterprise (Kawecka-Endler A., 2006, p. 37). Assembly work can be divided into three groups: manual, machine-manual and machine. In the case of exclusively manual work, it is necessary to provide tools with which to join elements. However, in machine-manual work, there are a few mechanized processes which require mechanical tools. In machine work, an employee's participation is limited to setting and positioning the joined elements and machine parameters.

The manual and machine-manual assembly operations most commonly used in the assembly of composite units are performed by the human. Therefore, it is the human that bears the greatest load, at the same time being the most important link in the process. It is therefore necessary that these activities are designed in accordance with the basic principles of ergonomics and work safety. Design should take into account organizational, technical and material factors, and solutions should shape an appropriate ergonomic quality of the human-work system.

While performing assembly operations, the employee is exposed to a number of ailments related to the method of performing work. In particular, attention should be paid to:

- the position of the employee during work – assembly is usually performed in a standing or sitting position; forced positions reduce the efficiency and accuracy of work, as well as increase employee fatigue and burden. Undesirable positions include, e.g., twisted back,

elbows abducted away from the body, bent wrists, bent neck. The reasons for awkward postures during work may include a poorly organized workstation and not taking into account the natural range of motion of the worker's limbs,

- the physical effort necessary in order to perform work, e.g., using materials and tools,
- the performed movements – unnecessary or excessive movements during assembly and operating equipment should be identified,
- fatigue caused by monotonous work, constant bending, extending arms and gripping,
- workstation organization – includes the identification of hard and sharp pressure points such as tabletop edges, tools, the assembled objects or other protrusions; it is necessary to provide employees with sufficient space for legs and knees,
- the work environment – the parameters of the material work environment, such as lighting, microclimate and others, affecting the efficiency of the performed activities should be identified.

One of the main features of an ergonomic assembly station is the adaptation of the arrangement of tools, materials and containers to the anthropometric parameters of the user. The surface intended for materials and tools as well as the free space should allow for freedom of hand movements during the performance of activities and a sense of comfort for the employee. Movements that are performed while working at the assembly workstation are characterized by repeatability or are prolonged. When using hand tools, repeated wrist extension occurs. Hand tools can also contribute to forearm muscle strain. This symptom may occur in situations where high torque is generated by the tools. With a sudden increase in torque, this phenomenon may be exacerbated.

Assembly work may also cause workers to suffer from disorders arising from overload to the musculoskeletal system. It is a result of mechanical loads that exceed physical strength and the performance of the static-dynamic parts of the human body. Overload syndromes are caused by the following movements: squeezing, reaching, moving, twisting, pressing. The main causes of overload syndromes are grouped into the following:

- fast, repetitive movements of low force and high frequency,
- static muscular loads,
- prolonged immobility or movement limited to a certain degree.

Disorders that arise as a result of overload syndromes during work related to the technical maintenance of machines include (Butlewski, Tytyk 2008):

- avascular necrosis of carpal bones,
- meniscus tears,
- stress fractures of the wrist,
- De Quervain syndrome,
- injuries to the muscles and tendons,
- tension neck syndrome and carpal tunnel syndrome,
- arm tendonitis.

The ergonomic quality of hand tools plays a very important role in the workplace. Its inadequacy can lead to injuries. The long-term, continuous impact of the tool on the employee may aggravate the causes of diseases from the group of Cumulative Trauma Disorders (CTD), i.e., diseases associated with injuries arising from the accumulation of microtrauma. Such injuries include those that arise as a result of too much pressure on a part of the body (hand) of the user. The amount of pressure is measured by the PPT (Pressure Pain Threshold), which is an indication of the pressure on the hand that elicits pain and is limited by the part of the hand, the force used and the gender of the person using the tool.

The above-mentioned ergonomic problems of manual assembly workstations occur to varying degrees, depending on the type of work performed and the tools and organization of the workplace. Nevertheless, they should be considered in enterprises in which manual assembly is the main problem in conducting production processes.

Research methodology

The research was carried out on the example of a frame support assembly (Fig. 1). The research began with determining all the possible sequences of part assembly with the use of a program for assembly optimization (Suszyński, Ciszak, Żurek 2008) and creating a graph showing all the acceptable sequences (Fig. 2). Then, tests were carried out and the assembly process at the prepared research workstation was analyzed. Each assembly sequence was recorded and evaluated using the Ergonomic Risk Assessment (ERA) method (www.e-c-n.de) and its duration was measured. Assembly consisted of the following parts:

1. Frame
2. Pneumatic connector
3. Support nr 1
4. Support nr 2
5. M10x280 screw nr 1
6. M10x320 screw nr 2
7. Air intake
8. M6x160 screw nr 1
9. M6x160 screw nr 2

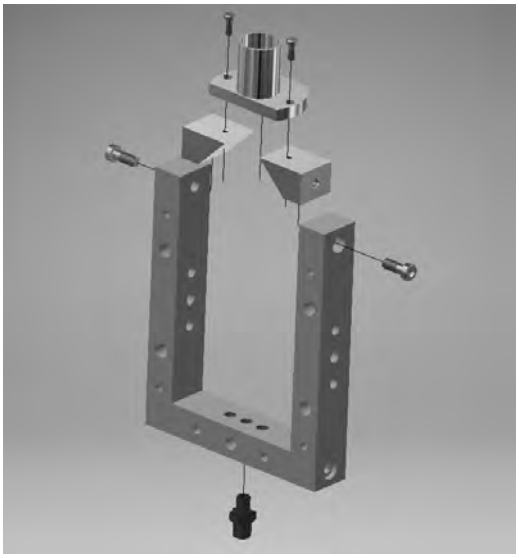

Fig. 1. Visualization of the assembled components

The applied ERA method aggregated the level of ergonomic risk for a specific assembly sequence. The activities performed during the work were observed, and the positions of the individual parts of the body allowed for a separate assessment of the risk factors for: the trunk, head and neck, left shoulder, right shoulder, left elbow, right elbow, left wrist, right wrist. Ultimately, the total score consists of the sum of individual partial assessments and indicates the risk assessment for the activities undertaken as part of the work.

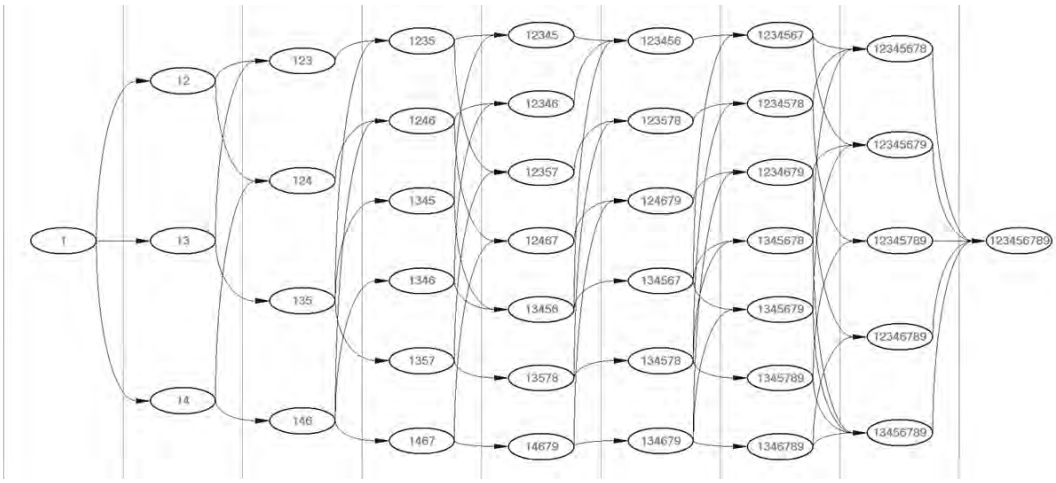

Fig. 2. Directed graph of the design constraints

Fig. 3. Planes of the performed recordings

The first trial sequences were not measured in terms of their duration or how they were performed. After several trials, the task was started. Each time, the subject was presented with a diagram of the assembly sequence which he was obliged to follow. The task did not entail the use of powered hand tools or any other tools other than hand tools.

Results

Despite the prior assumption that the sequences were possible to perform, three sequences were not completed. They turned out to be too difficult to manipulate – after making an attempt the test subject determined these assembly sequences to be impossible. The results of the obtained assembly times along with ergonomic assessments are shown in Figure 4.

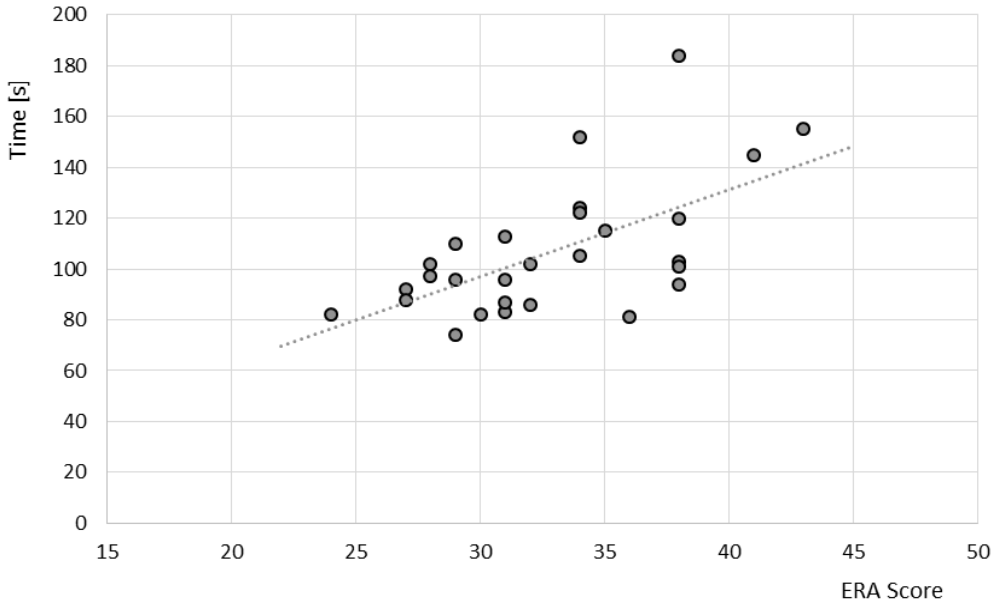

Fig. 4. Relationship between time of assembly and ERA load score

In addition to the evidently strenuous positions of the shoulder, elbow and wrist during highly repetitive manual handling work, a relationship between task duration and the ergonomic assessment score was observed. As one might have guessed, the part of the body under the most strain is the wrist and hand where numerous movements such as dorsiflexion, palmarflexion, radial deviation as well as pinch grip occur. Palmarflexion could be observed already when taking the components of the support out from their containers. Deeper palmarflexion and dorsiflexion occurred when driving screws. Radial and ulnar deviation most often occurred when turning over objects.

Some of the sequences that included attaching component nr 2 (pneumatic connector) at the beginning of the sequence were unergonomic due to the inability to conveniently arrange the frame on the table top – they forced the user into awkward positions. At the same time, they made it difficult to join the next components, which in turn affected the total duration of manual assembly. For this reason, the attachment of parts which impair the manipulation of the object should take place at the end of the assembly sequence. For the sequences with the shortest assembly time, a common feature was noted. Attaching the pneumatic connector was the last or second to last action in the sequence. Sequences with the lowest ERA score also did not contribute to working within an acceptable zone of safety, however, they were characterized by the lowest number of frame repositions. A reduced load was also associated with a short component positioning time, and the best results were obtained when, after finishing attaching one part, the installer proceeded to the next component nearby. A significant part of the ergonomic load occurred not so much because of the assembly operation itself, but when reaching for the part to be assembled. The researchers wanted the assembly process to be similar to the actual conditions, hence the parts were stored in trays.

The aforementioned activities allowed us to propose a universal method for determining an optimal assembly sequence. In this regard, the procedure should consist of the following steps:

1. Analysis of the assembled component:
   a) Determining the technological limitations of the assembly sequence,
   b) Generating all possible assembly sequences,
   c) Rejecting unacceptable sequences in violation of ergonomic assembly rules or contrary to DFA principles;
2. Adaptation of the workstation to anthropometric dimensions:
   a) Adjusting the seat and backrest,
   b) Setting the working table (for assembly in the sitting position),
   c) Setting the working table (for assembly in the standing position),
   d) Arranging tools, materials and containers;

3. Assembly sequence testing:
    a) Ensuring repeatability by conducting an adequate number of pre-test cycles to avoid the learning curve,
    b) Arranging recording devices (observation from the sagittal and transverse planes) and checking their synchronization
4. Results analysis:
    a) Comparing sequence durations and determining ergonomic burden,
    b) Determining the underlying causes of ergonomic risk factors and, if possible, eliminating them,
    c) Selecting the optimal assembly sequence based on its duration and an aggregate ergonomic assessment.

An operator should be equipped with a psychomotor disposition that will …. have the appropriate set of psychomotor features (Sadłowska-Wrzesińska, Gabryelewicz, Krupa, 2017) that will facilitate a quick and satisfactory assembly performance. Performing the analysis in accordance with the proposed method should yield a sequence that meets both the requirements of technological efficiency and the highest possible ergonomic quality.

Discussion and conclusions

Assembly is one of the most important stages of production, during which specific product features are formed. In many enterprises there are barriers that prevent the automation of processes, which is why manual assembly is still very important. The manual assembly process involves highly repetitive movements and activities. Regardless of whether the activities are performed correctly, their repetition is a burden on the employee. For this reason, it is important to limit the ergonomic risk factors that appear during this type of work.

The main aim of the research presented in the article was to create a procedure which organizes the sequence of activities in the assembly process, taking into account results of the ergonomic risk assessment. Using software dedicated for this purpose, it was possible to determine all the possible sequences of joining components. The research has shown that the sequences indicated by the system are not always optimal, and other factors, such as ergonomic ones, should be considered. The last part of the research included an analysis of the results collected from the programs and an analysis based on ergonomic assessment methods.

Based on the undertaken research, we can conclude that the assembly sequence is very important to the way the work is carried out and the resulting ergonomic burden. Research developments on musculoskeletal loads during manual assembly work can confirm the benefits of analyzing this issue, e.g., increasing productivity and an employee's physical and mental comfort during work..

References

Butlewski, M.
2017
Taxonomy of responsibility allocation in Human-Machine Systems with different levels of automation. In MATEC Web of Conferences (Vol. 137, p. 01002). EDP Sciences.
Kawecka- Endler A.,
2006
Montaż wyrobów-aspekty ergonomiczne i jakościowe, w: Hamrol A. (red.), Zeszyty Politechniki Poznańskiej- Organizacja i Zarządzanie, Zeszyt nr 43, str. 33-52, Wydawnictwo Politechniki Poznańskiej, Poznań, 2006.
Butlewski M., Tytyk E.,
2008
The ergonomic features of non-powered hand tools used by technical service tasks. [in]: Ergonomics in Contemporary Enterprise, Ed. By Leszek M. Pacholski & Stefan Trzcieliński, Proceedings of the Eleventh International Conference on Human Aspects of Advanced Manufacturing, Agility and Hybrid Automation; and Fourth International Conference ERGON-AXIA, July 9 – 12, Poznań, Poland; IEA Press, 610 Walnut Street 575 WARF, Madison, WI 53736, USA, 450-464. ISBN 978-0-9796435-0-7; ISBN 0-9796435-0-3.

Suszyński, M., Ciszak, O., & Żurek, J.
2008
Modelowanie montażowej struktury wyrobu za pomocą hipergrafu i grafu skierowanego oraz ustalanie dopuszczalnej kolejności montażu. Archiwum Technologii Maszyn i Automatyzacji, 4, 28.
Gajšek, B., Vujica, H.N., Butlewski, M. & Đukić, G.
2017
Research opportunity: incorporation of human factors in order picking system models. Organizacja i Zarządzanie 72, 45-61. DOI: 10.21008/j.0239-9415.2017.072.04.
Grzybowska K., Łupicka A.,
2017
Future competencies in the automotive industry – practitioners' opinions, Proceedings of the 30th International Business Information Management Association Conference (IBIMA) 8-9 November 2017 Madrid Spain; Vision 2020: Sustainable Economic development, Innovation Management, and Global Growth; K.S. Soliman (ed.) XLVI, pp. 5199-5208, 2017
Hamrol, A; Kowalik, D; Kujawinska, A,
2011
Impact of Selected Work Condition Factors on Quality of Manual Assembly Process, Human Factors and Ergonomics in Manufacturing & Service Industries, Volume: 21 Issue: 2 Pages: 156-163 DOI: 10.1002/hfm.20233, Published: MAR-APR 2011
Sadłowska–Wrzesińska, J., Gabryelewicz, I., & Krupa, P.
2017
The use of IT tools for the analysis and evaluation of psychomotor efficiency of employees. In MATEC Web of Conferences (Vol. 94, p. 06017). EDP Sciences.
Jasiulewicz-Kaczmarek M and Saniuk A
2015
Human factor in Sustainable Manufacturing, in: M. Antona, C. Stephanidis (ed.), Universal Access in Human-Computer Interaction. Access to the Human Environment and Culture, LNCS Vol. 9178, pp.444 – 455, DOI 10.1007/978-3-319-20687-5_43
Practical experience with methods of job evaluation
access: 2017
http://www.e-c-n.de/tagungsartikel/2014_Haller/index_en.htm

BENCHMARKING E-LEARNING IN HIGHER EDUCATION: MEASURING VALUED ACTIVITIES OR VALUING MEASURED ACTIVITIES

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Abstract

Purpose *- This paper describes the process and outcomes of a benchmarking exercise to establish the state of knowledge of e-learning activity within an Irish Higher Education institution. It poses the problems of benchmarking within Higher Education at an early stage of benchmarking adoption without national guidelines, the development of supporting frameworks, and the roles of main agencies and actors.*

Methodology *- A questionnaire using an adapted version of the ACODE benchmarking system was used as the basis for interviews to produce agreed statements of e-learning. Analysis of quantitative data was conducted using SPSSv24 to determine the overall positioning of the stakeholders.*

Findings *– Communication of policies, procedures and practices by executive staff was limited and found to be a barrier to progress.*

Research limitations *– A single study does not provide sufficient evidence for generalization of methodology or findings. Further studies are necessary to determine longitudinal stability.*

Practical Implications *- The statistical outputs provide evidence-based support for the development of a strategic plan, supporting action plan, evidence-based metrics and values.*

Originality/value *- Conclusions and observations from the benchmarking exercise, Letterkenny Institute of Technology (Lyit), may be beneficial to other Higher Education Institutions.*

Keywords*: e-learning, benchmarking, strategic plan*

Introduction

E-learning was formalised as a process within Lyit in 2002 with the introduction of a virtual learning environment to add value to existing and future course offerings. The process was adopted in an ad-hoc manner until 2008 with the formation of a committee to represent the broad spectrum of activities in the Institute to oversee and develop further the Institute's online capacity. The Institute was at a transitional stage, and e-learning was becoming a significant and integral feature in the student experience; the benefits, costs, issues, and opportunities were becoming clearer to all executive staff. A decision was made in academic year 2012/13 to engage with a benchmarking process, at a strategic level to better understand the position of the institute in relation to e-learning, for planning, resourcing, and budgetary forecasting, with a view to maximising the performance of the Institute whilst remaining cognizant of the National Strategy for Higher education to 2030 (HEA, 2017). The key initiatives identified by the National Strategy for Higher Education in Ireland include: Widening of participation; exploration of international opportunities; quality assurance; assessment; flexible course design; maximise use of all pedagogical tools available.

Benchmarking in Higher Education in Ireland was relatively unknown and there were no formal guidelines for the process; neither within higher education nor stipulated by the Department for Education. A similar situation in the UK was true only 5 years earlier (Bacsich, 2009; Scott, 2011). Hence, the literature review for the process was initiated from a Google Scholar search on e-learning

benchmarking using a snowball effect to establish definitions and to seek an appropriate and acceptable framework. The process of benchmarking in Higher Education is succinctly different (Jackson, 2001) from the processes in Business (IFIP TC5, 1996) particularly in relation to the national political aspects of Higher Education. The UK Higher Education Academy is recognised as a point of reference for excellence in issues pertaining to Higher Education within Europe however, benchmarking does not appear as a term in the site index (HEA UK, 2018). This omission was initially surprising given the various frameworks that higher education establishments in UK must operate within.

The literature review focused on benchmarking for higher education Institutions and avoided the specific field of subject benchmarking. The review did not find any benchmarking documents for Ireland; the UK benchmarking returns were fragmented, as were those for Canada, and no literature was found in USA. Searches in Asia – Hong Kong, Australia and New Zealand, provided descriptions and tones within benchmarking which, may be deemed appropriate for construction of a relevant set of procedures and metrics. The first UK technology enhanced learning benchmarking summit took place in 2017 between the Open University and the Australasian Council on Open, Distance and E-Learning (OU, 2017); the purpose was to share good practice.

A major consideration in the process was the need to create boundaries for the investigation. The bounded process permitted a timeline to be developed with the aim of producing an executive report within one academic year. It was recognised immediately that the only way to achieve a meaningful output would be through scheduled individual interviews rather than a blanket questionnaire to all staff and students.

The benchmarking system adopted is based on the Australasian Council on Open, Distance and E-Learning (ACODE, 2012) benchmarks. This system was first piloted in 2004 and is employed by many tertiary level establishments in Australia. Other influential models were considered but found to be too complex to operate within the bounds of this programme of work (ELTI, 2003a; ELTI, 2003b; Marshal & Mitchell, 2005; Scott, 2011).

The benchmarking methods examined, by means of a desktop study, all share common threads that may be described as:

1. Skills and aptitude of learners to engage with e-Learning.
2. Routine use of e-Learning resources, tools and approaches by staff where appropriate.
3. Optimised and blended approach of traditional and online methods.
4. Incorporation of e-Learning into the Institutional governance and quality assurance processes.
5. Infrastructural support to enable e-Learning.
6. Coordination and review of processes for continuous improvement.

The objectives of the benchmarking project were:

1. Identify a benchmarking template within the constraints of the project
2. Conduct benchmarking using a structured methodology

Methodology

The ACODE benchmarking template consists of 8 thematic benchmarks; each benchmark is comprised of associated performance indicators and performance measures to aid the individual benchmark ranking. A set of performance indicator questions, each with 5 possible performance alignment measure answers (1=none, 2=limited, 3=moderate, 4=considerable, 5=complete), was generated from the ACODE documentation for each benchmark and determined to be appropriate for a higher education institution of the size and nature of Letterkenny Institute of Technology. The benchmarks and associated questions were approved by the executive board of the institute prior to operationalization of the process.

A structured interview approach was considered most appropriate to ensure consistency within the relatively short window of opportunity in a single academic year. A pro-forma interview booklet containing all benchmarking information was developed as follows:

Benchmark 1: Institution policy and governance for technology supported learning and teaching

8 Performance Indicators and 5 Performance Measures

Benchmark 2: Planning for, and quality improvement of the integration of technologies for learning and teaching

8 Performance Indicators and 5 Performance Measures

Benchmark 3: Information technology infrastructure to support learning and teaching

9 Performance Indicators and 5 Performance Measures

Benchmark 4: Pedagogical application of information and communication technology

13 Performance Indicators and 5 Performance Measures

Benchmark 5: Professional/staff development for the effective use of technologies for learning and teaching

8 Performance Indicators and 5 Performance Measures

Benchmark 6: Staff support for the use of technologies for learning and teaching

9 Performance Indicators and 5 Performance Measures

Benchmark 7: Student training for the effective use of technologies for learning

9 Performance Indicators and 5 Performance Measures

Benchmark 8: Student support for the use of technologies for learning

10 Performance Indicators and 5 Performance Measures

The selected stakeholders received a copy of the interview question booklet along with an explanation of the overall process in advance of the meetings. Stakeholders were asked to discuss the benchmarks and provide factual input where possible. Perceptions were also documented where stakeholders were unsure about particular measures. The stakeholder interviews comprised 14 members of management including President, Registrar and all heads of faculty and departments, 13 members of academic staff from each faculty, 4 members of support staff and a sample of 16 students. Students were not expected to have knowledge of benchmarks 1 to 6; hence, the students were only asked about their knowledge and perceptions of benchmarks 7 and 8.

A five point rating system relating to the performance measures was employed to make an overall judgement on each of the benchmarking questions. A value of ‘5’ means that there is coherence and strength in that area whereas a value of ‘1’ means that this area is poor and definitely needs strengthening.

The benchmarking interview process was conducted face-to-face using a single researcher to maintain consistency of questioning. In addition to the interviewees a number of additional academic staff wished to inform the process by supplying comments for consideration.

Results

Benchmark 1: Institution policy and governance for technology supported learning and teaching

Performance Indicators

1. Institution strategic and operational plans recognise and support the use of technologies to facilitate learning and teaching.
2. Specific plans relating to the use of learning and teaching technologies are aligned with the institution’s strategic and operational plans.
3. Planning for learning and teaching technologies is aligned with the budget process.

4. Institution policies specify the use of technologies to support learning and teaching covering all aspects and stakeholder perspectives.
5. Policies are well disseminated and applied.
6. The institution has established governance mechanisms for learning and teaching with technologies that include representation from key stakeholders.
7. Clear management structures identify responsibilities and authority.
8. Decisions regarding new technology adoption are made within current policy frameworks.

Brief Summary of Results for all respondents

Mean: 2.122

Standard Deviation: 1.0890

Number of Respondents: 31

Benchmark 2: Planning for, and quality improvement of the integration of technologies for learning and teaching

Performance Indicators

1. Institution wide processes for quality assurance are in place and in use to integrate technologies in learning and teaching.
2. Institution and Faculty plans are aligned with institution policy for the use of technology in learning and teaching.
3. Operationalisation is planned and evaluated.
4. Planning and quality improvement is resourced.
5. Collaboration for integrating technology in learning and teaching occurs across key functional areas.
6. Evaluation cycles are in place to measure key performance indicators for all key stakeholders.
7. Outcomes are reported to all levels of the institution.
8. Evaluation feedback is integrated in planning for continuous improvement purposes.

Brief Summary of Results

Mean: 2.188

Standard Deviation: 1.0516

Number of Respondents: 31

Benchmark 3: Information technology infrastructure to support learning and teaching

Performance Indicators

1. Evaluation processes are in place to generate data to support decision making.
2. Evaluation processes are comprehensive.
3. Responsibilities and processes for maintenance and administration are effective and efficient.
4. Responsibilities and processes for support and training are effective and efficient.
5. Project management processes are in place, responsibilities defined and processes applied.
6. Resources are allocated for maintenance and upgrades of existing equipment.
7. Implementation is well planned.
8. Implementation is resourced.
9. Professional development occurs for staff managing infrastructure (including new and emerging technologies).

Brief Summary of Results

Mean: 3.294

Standard Deviation: 1.2023

Number of Respondents: 31

Benchmark 4: Pedagogical application of information and communication technology

Performance indicators are organised to reflect these aspects of pedagogical application. Performance Indicators

1. Pedagogical applications are grounded in the context of the institution's learning and teaching strategy.
2. The intent of pedagogical applications of ICT is readily available to all teaching and teaching support staff.
3. Pedagogical application is based on sound educational research and good practice.
4. Guidelines (including compliance with legal requirements, accessibility, and learning designs) for the pedagogical application of ICT are readily available to all teaching and teaching support staff and in use.
5. Examples of good practice are available and in use.
6. Communities of practice exist for communicating and promoting the innovative use of pedagogical applications in learning and teaching.
7. Professional development covering e-learning pedagogy is available for all teaching staff and used.
8. Tools for the pedagogical application of ICT are available for all teaching staff and in use.
9. Resources are allocated for developing e-learning projects.
10. The pedagogical application of ICT is sustainable.
11. Deployment of pedagogical applications of ICT is evaluated at the unit of study level including students' learning outcomes.
12. Overall, pedagogical application of ICT is evaluated.
13. Evaluation of feedback is integrated in planning for continuous improvement of pedagogical application.

Brief Summary of Results

Mean: 2.367

Standard Deviation: 1.0791

Number of Respondents: 31

Benchmark 5: Professional/staff development for the effective use of technologies for learning and teaching

Performance Indicators

1. All of the institution's obligations to learning and teaching technologies are clearly communicated in its strategies, policies and practices.
2. Processes are in place and in use to identify staff development needs for the institution's strategic development.
3. Processes are in place and in use to identify individual staff development needs.
4. Educational and technical expertise is available to develop and support quality programs and resources which address staff needs, including those with special needs.
5. Staff development programs are coordinated with other service units.
6. Staff development is resourced.

7. Professional/staff development programs can be delivered flexibly and address differing skill levels.
8. Evaluation of feedback is integrated in planning for continuous improvement of professionals/staff development processes.

Brief Summary of Results

Mean: 2.447

Standard Deviation: 1.0603

Number of Respondents: 31

Benchmark 6: Staff support for the use of technologies for learning and teaching

Performance Indicators

1. Technical and/or educational support is aligned with the current and emerging technologies for learning and teaching in use at the institution.
2. Support needs are identified for individuals, work groups and the institution.
3. Support services for staff are evaluated for materials, procedures and systems.
4. Coordination occurs between areas providing staff support services.
5. Support provided is available, accessible and used by staff.
6. Support services are adequately resourced.
7. Support services are promoted to staff.
8. New technologies are analysed for staff support implications.
9. Evaluation of feedback is integrated in planning for continuous improvement purposes.

Brief Summary of Results

Mean: 2.570

Standard Deviation: 1.0129

Number of Respondents: 31

Benchmark 7: Student training for the effective use of technologies for learning

Performance Indicators

1. Student training is aligned with the use of technologies and teaching approaches in use at the institution.
2. Student training is resourced.
3. Processes are in place to determine student needs and maintain alignment with those needs.
4. Processes are in place to evaluate student satisfaction with their training.
5. Coordination occurs between areas providing student training.
6. Student training is delivered flexibly and tailored to address differing needs.
7. Student training promotes an ethical approach to the use of technologies for learning.
8. Materials used in student training and student support are complementary.
9. Evaluation of feedback is integrated in planning for continuous improvement purposes.

Brief Summary of Results

Mean: 2.226

Standard Deviation: 1.0460

Number of Respondents: 47

Benchmark 8: Student support for the use of technologies for learning

Performance Indicators:

1. The provision of support for students is integrated with current and emerging technologies for learning that are in use at the institution.
2. Support services are resourced.
3. Support services are promoted to the student body.
4. Support is available and accessible to students and used.
5. Support services for students are evaluated – for materials, procedures and systems.
6. Coordination occurs between areas providing student support.
7. Processes are in place to determine the ongoing support needs of students.
8. Evaluation of feedback is integrated in planning for continuous improvement purposes.
9. New learning technology initiatives are analyzed for student support implications.
10. Materials used in student training and student support are complementary.

Brief Summary of Results

Mean:	2.435
Standard Deviation:	1.1388
Number of Respondents:	47

Analysis

The Institute strategy to 2013 did not specify the use of technologies to support teaching and learning. The mean response to Benchmark 1 is low and indicated concern regarding authority and responsibility for e-Learning, lack of strategic and operational plans, and poor visibility of Institute policies and practices.

The Institute has a comprehensive quality assurance programme in place designed for a traditional face-to-face environment, which does not address the particular needs of a technology-enhanced model. The low mean response in Benchmark 2 suggests that policies are unclear regarding the use of technologies in teaching and learning.

Benchmark 3 relating to IT infrastructure obtained the highest scoring overall. The technical infrastructure is managed, administered and maintained in an orderly fashion.

The low scoring for Benchmark 4, the pedagogical application of the ICT within teaching and learning, is a concern. Strategies for teaching and learning and e-Learning are not aligned to the strategic pedagogical goals of the institution. Many practitioners are struggling regarding pedagogical requirements; they are unsure about the guidelines and how they should be applied. The deployment of resources and support is highly dependent on external funding leading to a feeling by many that their pedagogical developments are not sustainable in the long term. The pedagogical application of ICT is not evaluated at the level of the student learning outcomes, and the processes for the evaluation of feedback and their subsequent integration in planning for continuous improvement are not visible.

Staff development in Benchmark 5 indicates that the current programme is average in nature. Lecturers are supported to a certain extent as individuals and to a lesser degree as members of the Institute. A programme to identify needs at the level of the institute is not visible to teaching staff. Access to educational and technical expertise is available on request but is increasingly becoming limited by a reduction in available finance.

The data relating to the support of teaching staff revealed the closest alignment between management and teaching staff. The overall score in Benchmark 6 is just above average and there is strong correlation between the responses. The current programme is focused on the use of Blackboard, and is quite well aligned with current needs.

The scoring in benchmark 7 for the provision of student training indicates a particular concern by the student body and teaching staff. Students receive basic introductory training during induction but do not receive any further training. All students receive the same training programme irrespective of needs. The training programme is not sufficiently flexible to cater for students not present at the allotted time. All students are made aware of the need for an ethical approach to the use of technologies. A visible mechanism for the evaluation of feedback from the student-training programme is not evident.

Benchmark 8 received the lowest score from the students and is considerably lower than that indicated by management. The lack of correlation suggests that management is not fully aware of the issues affecting the student experience. The computer services help desks are not geared up to handle e-Learning requests. Some requests for support cannot be handled by the support services and frustration has been expressed because a Ping-Pong effect can develop between support and the teaching staff without an adequate resolution to the problem. Some students have been exposed to new technology initiatives with mixed reactions. Not all computers within the Institute utilise the same settings causing some interaction issues. A process for the introduction of new technology initiatives should be developed to ensure minimum disruption. Students do not consider that feedback is evaluated or integrated in planning for continuous improvement.

Brief Comparison between 2012/13 and 2017/18

Institutional Governance

The Institute has established a strategic plan for Teaching and Learning to dovetail with the e-learning strategy and forms a coherent approach to teaching and learning within the Institute. These plans and their accompanying operational plans are being aligned within the strict budgetary constrainst of the current economic climate

Dissemination and application of policies, procedures and practices has improved with development of a more accessible intranet to minimise confusion and distrust. A clear management structure with responsibilities and authority for e-learning has been established.

Barriers to e-Learning

E-Learning requires a strategic approach to be considered within the instructional design and as such it may take several iterations to produce the correct “look and feel” for a module and iron out any problems. Many modules are reallocated on an annual basis and this does not give comfort to members of staff who feel that their “online work” will be passed on to others or even discarded without consideration being given to the amount of effort required to generate appropriate materials. The tools required to meet the pedagogical needs of courses are not universal within higher education. Some courses lend themselves to rapid inclusion of e-learning whilst others such as engineering mathematics are more problematic.

Support for Students

The student body expressed concern at the lack of consistency within the Institute for online provision. Students’ basic training in the use of the Blackboard virtual learning environment takes place at induction in year 1 and very little else afterwards. When students encounter technical difficulties with Blackboard based materials it is not always clear where they should go to obtain support. Inconsistency in the learning enviornment is an additional stressor added by the learning system and is an unneccessary hinderance to the learning process.

Support for Staff

The majority of academic staff are becoming aware that uploading digital material to Blackboard is only the start of the e-learning process. However, it is felt that a point of contact within the Institute would be of benefit for those wishing to discuss or explore more advanced e-Learning options and techniques. This could prove useful as a mechanism for reducing the levels of anxiety experienced by many staff members. Pedagogical design for e-learning is not simply a matter of copying what is already done in face-to-face courses.

Discussion and Conclusions

Higher education is a building block within the local and national economy, and constantly has to revisit its strategic aims to ensure it remains focused on the needs of the region to maintain and grow the economy. The elements of Higher education have ramifications beyond the student body through research, consultation, education, and training. Performance at the highest level is expected by the community, region, national government, and increasingly at international level. Recognised performance is judged through measurement of values, ideals and outputs using structured and highly defined metrics. The multiple roles and complexity of higher education exacerbates the task of measuring performance and a balance must be struck between all actors and stakeholders.

E-learning is still a relatively young paradigm for many higher education establishments world wide and may be implemented in a variety of sound pedagogical designs, or as may be the case in a fragmented and ad-hoc manner. The conservative nature of higher education suggests that paradigms, which may be appropriate, are not engaged with in suitable temporal spaces. Resourcing, planning, and forecasting the application of disruptive technologies in education is not straightforward especially when national fiscal policies dictate an austere approach.

This paper describes the issues relating to the process of establishing benchmarking process within a higher education institution in Ireland. Strategic and developmental action plans with associated metrics were created from the evidenced outputs of the study. Each higher education institution is unique and a single benchmark process for higher education is not possible, however it is possible to consider the tools made available and to adjust the process accordingly.

Conducting an internal benchmarking exercise in higher education allows strategic decisions to be evidenced by the stakeholders associated with the organization. An open process allows stakeholders to respond with confidence to ensure that the true status of the organization is determined. Long term strategic policies, practices and procedures developed as a result of firm evidence and acted upon with an appropriate plan of action has the potential to aid growth and address areas of organizational uncertainty.

References

ACODE
2012
"Australasian Council on open, Distance and E-Learning",
https://www.acode.edu.au/mod/resource/view.php?id=193, accessed July 2018.
Bacsich, P.
2009
"Benchmarking e-learning in UK universities: lessons from and for the international context",
www.ou.nl/docs/campagnes/ICDE2009/papers/final_paper_338Bacsich.pdf
ELTI
2003a
"Embedded Learning Technologies Institutionally", ELTI workshop pack for Higher and Further Education Audit Tools, www.jisc.ac.uk/uploaded_documents/workshop_pack_audit_tools_v5.doc
2003b
"Facilitator's Guide",
www.jisc.ac.uk/media/documents/programmes/jos/workshop_pack_facilitator_v5.pdf
HEA
2017
"National Strategy for Higher Education 2030" http://hea.ie/assets/uploads/2017/06/National-Strategy-for-Higher-Education-2030.pdf
HEA UK
2018
https://www.heacademy.ac.uk, last accessed Apr 2018
IFIP TC5
1996
"Modelling Techniques for Business Process Re-engineering and Benchmarking", IFIP TC5 WG5.7 International Workshop on Modelling Techniques for Business Process Re-engineering and Benchmarking, 18-19 April 1996, Bordeaux France

https://books.google.co.uk/books?hl=en&lr=&id=5pV7CwAAQBAJ&oi=fnd&pg=PR8&dq=benchmarking+in+business&ots=WncVjcJ-v2&sig=MmUfZEUQBK34IFdVZYysknJn6g4#v=onepage&q=benchmarking%20in%20business&f=false

Jackson, N.
2001
"Benchmarking in UK HE: an overview", Quality Assurance in education, 9(1) pp. 218 – 235

Marshall, S., and Mitchell, G.
2005
"E-learning process maturity in the New Zealand tertiary sector"
http://unpan1.un.org/intradoc/groups/public/documents/apcity/unpan046298.pdf accessed July 2018

OU
2017
"ACODE-UK 2017 TEL Benchmarking Summit", http://www.open.ac.uk/acode-uk/, last accessed June 2018

Scott, R.
2011
Benchmarking: A literature review. Academic Excellence, Centre for Learning & Development, Edith Cowan University, Australia URL: https://intranet.ecu.edu.au/__data/assets/pdf_file/0010/357193/Benchmarking-Literature-Review.pdf, last accessed Apr 2018.

STUDYING STUDENTS' PERCEPTIONS OF E-LEARNING – PRECONDITION FOR INCREASING THE PERFORMANCE OF EDUCATIONAL MANAGEMENT

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Abstract

Purpose *– The aim of this exploratory research is to investigate students' perceptions and to find out their readiness to access and use e-learning technologies to train for their professional skills.*

Methodology/approach *– The empirical research started with the organization of one focus group in the university. Interviews were recorded (audio & video) and transcribed (based on verbal, prosodic and nonverbal communication). Transcript results had been synthetized to depict theoretical constructs, themes and repeating ideas about e-learning.*

Findings *– The study has identified the main factors influencing students' perception and the key advantages and disadvantages of e-learning. It supports a more efficient and effective educational process (teaching-learning-assessment) that may be improved through e-learning.*

Research limitations/implications *– The study focuses on qualitative analysis to identify advantages and disadvantages of e-learning. Based on results a new quantitative study will be developed seeking a deeper analysis of students' perceptions on e-learning.*

Practical implications *– Research results may be used by the university and faculty management as support for developing strategies that could enhance the benefits of using virtual learning environments.*

Originality/value *– Research results are valuable contributions towards the improvement of educational management performance.*

Key words: *e-learning, advantages, disadvantages.*

Introduction

According to the current legislation (National Education Law No. 1/2011, art. 2 (3)), Romanian education system aims to "develop the entire human individuality in a freely and harmonious way that would enable autonomous personality formation, assumption of a value system required for personal development and fulfilment, for the development of the entrepreneurial spirit, active citizenship involvement in society, social inclusion and employment on labor market". Human resource must have adequate training in order to provide appropriate performance as required by utility delivered to society and accepted by individuals. There are two essential factors needed to increase the performance of the educational management: The adaptation of the educational process to students' particularities and the use of the most modern educational means and techniques. Therefore, education has to improve its traditional experience in order to meet the needs of young people who have integrated ICT in everyday life.

Since Romanian university education has already familiarized with blended learning capitalized on its advantages, our research is committed to assess how are the students prepared to acquire skills and abilities through e-learning. Therefore, the aim of this exploratory research is to investigate students' perceptions and to find out their readiness to access and use e-learning technologies to train for their professional skills.

E-learning emerged from the need to respond to the appetite of young people for new technologies (Norberg, Dziuban and Moskal, 2011) that enable “students' learning opportunities in synchronous and asynchronous modalities”. Therefore, educational systems have to adapt to latest IT development and student's behavior regarding internet usage, as beyond traditional education the "virtual environment" provides excellent opportunities for both teaching and learning. Such opportunities cannot be ignored by universities as learning also enters the globalized market. This exploratory research analyses student’s perceptions regarding readiness to access and use e-learning technologies to become experts in their field and profession.

Review of literature

Due to the latest ITC developments including increased Internet speed on both network and mobile communications, e-learning has experienced a constant increase of popularity and adoption in both academic and business environment (Museanu and Birsanu, 2018). E-learning appears in 1960 when educators/ instructors / mentors from academic, business, HR and army environments started to use IT in order to support and enhance trancing and training (Nicholson, 2007). The first decades classical e-learning emerged as providing study content – documents, audio and video files – that enabled synchronous and asynchronous communication. Later, e-learning was further enhanced based on innovative virtual reality (Tretsiakova-McNally, S., Maranne, E., Verbecke, F., and V. Molkov, 2017). Since 2000 e-learning became an advanced education system that attracted the attention of the educators across the world (Smith, 2009). It has three key advantages by facilitating the access to online teaching and learning resources, offering a collaborative environment for the students (Rossi, 2009) and reducing the cost of provision and therefore increasing academic institutions revenues (Ho and Dzeng, 2010), thus playing an important role in teaching and learning (Nedungadi and Raman, 2012). Today, e-learning is an expression of modern education based on online courses, virtual classes, simulators supporting students to develop their skills and competences.

There are several scholars (Algahtani, 2011; Borstorff and Lowe, 2007) that identified perceived advantages and disadvantages of e-learning. The main advantages include:

- - it provides individualized support, flexible learning schedules enabling excessive interactions and collaboration among students and between learners and education providers;
- - enhances learner’s autonomy due to a significant more flexible educational program, feature important for mature students and/or professionals in continuing education programs or specific training activities;
- - provides greater flexibility as computer-generated environment overcomes issues of distance and time, learners being able to better customize their educational experience;
- - enhances Universities revenues through reduction of education delivery costs;
- - it enables students to take courses anyplace there is internet access in order to interact with specific platforms and web services.

The main disadvantages (Algahtani, 2011; Borstorff and Lowe, 2007) include:

- - reduces interactions both among students and with lecturer/tutor with smaller opportunities to socialize excepting forums;
- - there are significant difficulties for the student to receives clarifications/ explanations and interpretations compared with face to face teaching;
- - does not provide opportunities for students to develop oral communication skills;
- - may reduce the assessment objectivity through possible student fraud (plagiarism, cheating etc.);
- - for some technical subjects it is not possible to develop certain abilities and skills required by employers and academic curricula.

E-learning impact upon improving the quality of education. Recent studies focused on e-learning role in education quality assurance in order to assess whether it delivers a pedagogically structured learning experience with a clear learning paradigm (Liaw, Huang, and Chen, 2007).

Methodology

The empirical research started with the organization of one focus group in the university. Prior to that, interested students were encouraged to go through a brief course sequence on Moodle platform followed by a multiple-choice quiz. Students were selected to ensure representativeness in five categories: high grades and scholarships, with good results but just under the scholarship level (grades lower than scholarship threshold up to one point), those with poor academic performance and no scholarships, students that work (full-time or part-time) and those who have never worked.

Interviews were recorded and transcribed. A first transcript focused on the collection of information related only to verbal communication. The second transcription was completed prosodic communication elements (pitch, loudness and duration) were considered. At the third transcription, the information was done to collect information about nonverbal communication (signs / gestures related directly to posture, movement, gestures, mimics, appearance, position of bodies, etc.). It was made possible due to the acceptance of participants to be video recorded. Transcript results had been synthetized to depict theoretical constructs, themes and repeating ideas about e-learning.

The six steps methodology used for analysis (Auerbach and Silverstein, 2003) are: stating the research concerns and theoretical framework, selection of relevant text, identification of repeating ideas from relevant text, developing themes by grouping the repeating ideas into relevant categories, developing theoretical constructs from themes clustered consistent with the theoretical framework and creation of a theoretical narrative from the theoretical constructs. Based on raw text in order to select representative text where to identify the repeating ideas, we stated our research concern: to enhance our understanding of student's perception about e-learning in order to propose specific measures aimed to improve the educational management for a technical university. We believe that e-learning is beneficial to students.

Bias reduction in the qualitative analysis was possible by double coding performed by both authors. Next step was the harmonization of identified repeating ideas, themes and theoretical constructs. The key results are exhibited in Table 1.

Results

An in-depth analysis was performed using Excell by extracting repeating ideas from text and grouping them into themes. These enabled the development of theoretical constructs. In order to differentiate these elements, we used bold for theoretical constructs, italic for themes and normal text for repeating ideas (see table 1). The Excell format also included the relevant text extracted from the raw transcription.

Table 1. Theoretical constructs, themes and repeating ideas

Teaching **Participants know and agree the use of blended learning**	Key message: students need to understand the course content.
Types of teaching: face to face, blended learning	
Methods (classic/ modern) and means for teaching (Power Point, movies etc.)	
Use of examples to illustrate and understand theory	
Teaching effectiveness: understanding – required and appreciated by students	
Lecturer's role in teaching	
Physical presence in class of the lecturer	
In e-learning there is no teacher to ask for explanations	
Amount of information delivered, complexity and speed of teaching	
Lecturers involvement in facilitating understanding	
Learning **Participants require lecturers to support learning**	Key message: students perceive understanding course content as fundamental for ease of learning.
Student learning styles	
Read, underline text, synthetize course material	
Re-write the whole course	
Record myself reading the course and listen several times	
Time of learning	
Day/ night learning	
Term time / just before exam	
Assessment **Participants prefer certain assessment types**	Key message: students success depends on level

Assessment tools	of understanding.
Quiz, open questions, essays	
Projects and presentations	
Time of assessment	
During the semester	
End of term/ exam period	
Electronic resources **Participant use electronic resources with/ without teacher recommendations**	Key message: students seek resources that enhance understanding.
E-resources categories	
Course materials in MS. Word/ Acrobat reader format	
Short movies for demonstrations/ theory exemplification	
Means for transmitting e-resources	
Online- Offline access on websites	
Social networks (FB, WhatsApp, Instagram), YouTube	
Stick/ CD	
Complexity, size and lengths (to go through) of e-resources	
Access according to desired grade/ intellectual abilities	
Performance of personal computer/ smartphone	
Advantages of E-learning	Key message: students appreciate flexibility, ease of distance interactions and personalization of their learning experience.
Flexibility of access and distance interactions	
Flexibility to learn in any place (campus, home, train, etc.)	
Possibility to study anywhere (PC/smartphone and internet connection)	
Enable instant communication with colleagues in different locations	
Facilitates interaction with colleagues (chat, forum, messages, etc.)	
Courses accessed on personal available time	
Personalized learning	
Platform enables repetition so students learn in own rhythm	
Information is condensed and reduces access time	
Possibility to select just materials (according to own difficulty, etc.)	
Access to more explicit information (compared to face to face courses)	
Information is well structured	
Support personal efforts for higher grades	
Possibility to assess own knowledge by self-assessment tests	
Increase student satisfaction	
Disadvantages of E-learning	Key message: students may have difficulties adapting to virtual environment. Missing the human component may deprive them from understanding.
Preferences and attitudes toward e-learning	
Lack of academic environment	
Lack of face to face communication/ teacher absence	
Great effort to learn in a disciplined/ independent manner	
Courses longer than 30 minutes require too much effort	
Access (technical and cost-related)	
High costs to access certain resources (including for downloading)	
Not having a functional PC/ smart phone and access to mobile data	
Sometimes have to seek (move to) locations with free internet access	
Platform related	
Learning how to use the platform requires a lot of effort	
Difficulties to download some materials	
Quality content	
Uncertainty regarding information correctness	
Possibility of fraud during assessment (some colleagues my cheat)	

Discussion and conclusions

The study has identified the main factors influencing students' perception and the key advantages and disadvantages of e-learning. It supports a more efficient and effective educational process (teaching-learning-assessment) that may be improved through e-learning.

E-learning facilitate the development of competences, abilities and skills because it provides a large amount of information that support student knowledge through facile access to electronic content.

Student understanding depends on information complexity, its volume, speed of delivery and whether it is adapted to student's needs and intellectual capacity and background. As our research reveals,

students are aware of their roles and engage in learning according to their desired level. Across all the stages of the interview, we noted that students need a better understanding. The word “understand” occurs explicitly 18 times during the focus group, across all the six sections of the interview guide. A synthesis of these is exhibited in table 1 as key message for each part of the interview.

The main perceived advantages of e-learning are grouped on two major themes: flexibility of access and distance interactions and personalized learning. The first theme includes: flexibility to learn in any place (campus, home, train, etc.); possibility to study anywhere (PC/smartphone and internet connection); enable instant communication with colleagues in different locations; facilitates interaction with colleagues (chat, forum, messages, etc.) and courses accessed on personal available time. The second includes: platform enables repetition so students learn in own rhythm; information is condensed and reduces access time; possibility to select just materials (according to own difficulty, etc.); access to more explicit information (compared to face to face courses); information is well structured; support personal efforts for higher grades; possibility to assess own knowledge by self-assessment tests; increase student satisfaction.

The main perceived disadvantages are structured in four major themes: preferences and attitudes toward e-learning; access (technical and cost-related); platform related and quality content. These are: lack of academic environment; lack of face to face communication/ teacher absence; great effort to learn in a disciplined/ independent manner; courses longer than 30 minutes require too much effort; high costs to access certain resources (including for downloading); not having a functional PC/ smart phone and access to mobile data; sometimes have to seek (move to) locations with free internet access; learning how to use the platform requires a lot of effort; difficulties to download some materials; uncertainty regarding information correctness; possibility of fraud during assessment (some colleagues my cheat).

Research results are valuable contributions towards the improvement of educational management performance. They may be used by the university and faculty management as support for developing strategies that could enhance the benefits of using virtual learning environments. Based on these results a new quantitative study will be developed seeking a deeper analysis of students' perceptions on e-learning.

References

Algahtani, A. F.
2011
“Evaluating the Effectiveness of the E-learning Experience in Some Universities in Saudi Arabia from Male Students' Perceptions.” Durham theses. Durham University
Auerbach Carl F., and B. Louise Silverman
2013
”Qualitative data: an introduction to coding and analysis” New York, NEW YORK UNIVERSITY PRESS
Borstorff, P. C., and S. L. Lowe
2007
“Student perceptions and opinions toward e-learning in the college environment.” Academy of Educational Leadership Journal. 11(2): 13-30
Ho, C. L., and R. J. Dzeng
2010
”Construction Safety Training via E-Learning: Learning Effectiveness and User Satisfaction.” Computers & Education, 55 (2): 858-867.
Liaw,S., Huang, H., and G. Chen
2007
”An activity-theoretical approach to investigate learners’ factors toward e-learning systems.” Computers in Human Behavior. 23:1906–1920
Museanu, E., and T. Birsanu
2018
”E-Learning and its Pedagogical Challenges for Trainers.” The 14th International Scientific Conference, eLearning and Software for Education Bucharest, proceedings 2018: 182-186
Nedungadi, P., and R. Raman
2012

”A new approach to personalization: Integrating elearning and m-learning”. Etr & D-Educational Technology Research and Development, 60(4): 659 –678
Nicholson, P.
2007
”A history of e-learning.” In Fernández-Manjón, B. (ed.). Computers and Education: E-learning. From Theory to Practice. Springer
Norberg, A., Dziuban, C., and P. Moskal
2011
”A time-based blended learning model.” Journal On the Horizon, 19 (3): 207-216
Rossi, P.G.
2009
”Learning environment with artificial intelligence elements.” Journal of e-learning and knowledge society, 5(1): 67-75.
Rusu, B., and M. B. Tudose
2018
”Quantitative analysis of main advantages and disadvantages of the use of e-learning in a technical university.” E-Learning and its Pedagogical Challenges for Trainers.” The 14th International Scientific Conference, eLearning and Software for Education Bucharest, proceedings 2018: 96-103
Smith, B.
2009
”Student Rating of Teaching Effectiveness for Faculty Groups Based on Race and Gender.” Education, 129 (4): 615-624
Tretsiakova-McNally, S., Maranne, E., Verbecke, F., and V. Molkov
2017
”Mixed e-learning and virtual reality pedagogical approach for innovative hydrogen safety training of first responders.” International Journal of Hydrogen Energy. 42(11): 7504-7512

DESIGNING A TOOLKIT FOR PROCESS IMPROVEMENT IN AN ENGINEERING SERVICES START-UP

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Abstract

Purpose *– This paper is concerned with defining the most appropriate combination of engineering tools, management techniques and IT instruments for a small star-up company that is looking to create and manage their processes in a competitive way. The presented work is a case study that focuses on the needs and challenges to be addressed by an applied research company delivering services related to new product development and 3D prototyping.*

Methodology/approach *– Process improvement tools that are aimed at alleviating these shortcomings: low price, short training time, easily transferable, external support, improved effectiveness, etc., are used and analyzed within the confines of the case study.*

Findings *– Several tools and instruments are used to define a specific toolkit or package that could help startups with the challenges they are experiencing internally and on the market.*

Research limitations/implications *– Also, a discussion of the strong and weak points of the selected tools is presented, together with the identification of possible interactions and redundancies. The main limitations are related to the focus of the research on just one company.*

Practical implications – The findings in the paper are based on the experience of the authors and the response from the company. From the point of view of the potential users, the developed package becomes a more powerful tool to address their problems.

Originality/value *– The conclusions pave the way for a more in-depth approach involving a larger consultation base and a thorough examination of more process improvement tools.*

Key words: *Process improvement; Process tools and techniques; Start-Ups.*

Introduction

According to a study by KeysFin, at 99.91% of the total number of companies registered and operating in Romania, SMEs represent the engine driving growth and wellbeing (KeysFin, 2017). The key to getting healthy and resilient SMEs is to support innovative and creative start-ups with the know-how and resources they need to become competitive quickly. For a small business, each factor that influences its development and survivability, is a big concern. The main problems that today are encounter by SMEs include: low availability of labor force, control actions of various institutions, bureaucracy, lack of predictability of legal requirements, delayed payments, high bank interest and commissions, big material stocks, logistic problems, etc.

As presented by Wang (2016) and Rostamkalaei and Freel (2017), SMEs and start-up financing is a complex domain, in which both the public and the private sector can have contributions towards a healthier competitive environment. Since trust, brand and robustness are not established, the risks associated with these companies require many times other modes of financing than bank loans (acceleration programs, competitions, venture capital, etc.). However, beside the financial aspects, start-ups are usually faced with challenges concerning operational management, and they are unable

and ill-equipped to deal with them as they lack knowledge, experience and in-house solutions to boost product or firm competitiveness. For example, Wong, Tseng and Tan (2013) found that the implementation of business process management in synch with the company's technical elements will lead to improved results. At the same time, Igartua and Markuerkiaga (2017) propose the use of specific techniques in a structured approach in order to help SMEs become innovative.

The current paper describes the situation of a small (5 persons) start-up with 2 years of experience so far, working to provide services in the field of new product development, including design and prototyping, for the household goods and automotive components industries. Empiric research was used to observe the start-up processes and try to influence them in a positive manner. The analysis carried out considered the external environment that influences the company (suppliers, market, business environment, regulations, etc.) as well as the internal environment (employees, processes, equipment, etc.).

Research approach

Determinants of an organization's success, and especially for a start-up, is the ability of managers to adopt and introduce measures to help increase business success. In recent years it is a practice and a necessity for most of the companies to adopt and implement concepts like Lean Management, Six Sigma, Total Quality Management, Kaizen, that will improve the company process performance and the quality of products.

In order to identify the problems that need to be resolved and the possible solutions within the studied firm, a combination of known and less popular, but very useful, techniques was created. They were applied and studied in-situ to:

- Evaluate the competitive environment: SWOT analysis and PEST analysis;
- Implement process management: Flowcharting and SIPOC;
- Investigate non-conformities: 5 Whys and Ishikawa diagram.

For each direction, a concrete situation was analyzed, and the simple tool was applied first, followed by a debriefing interview and the application of the more complex tool with its own debrief. In parallel, observation of the processes and stakeholder engagement discussion took place to complete the overall image of the company's situation.

The case study was designed to reveal the interest and need of small, incipient, companies to solve their process management problems. The initial assumption made by the authors, is that, since they lack experience but also the time to dedicate to these issues, the companies in this category would benefit considerably from automated process improvement tool packages.

Process improvement case study

The first stage involved asking the founders and managers of the company to perform a SWOT analysis concerning their first 5-year business plan. Since this is a common instrument, taught in most engineering and management schools in the country, there were no significant issues in obtaining the result. An excerpt is presented in Figure 1 below.

Strengths	**Weaknesses**
Good command of design and development methodologies A motivated and time proven team of employees Existing software packages and 3D printing equipment Network of contacts and collaborators in the area	Small team, with young people, that lack experience No business and/or entrepreneurship success story Competing employment offers being considered Different views on development strategies
Opportunities	**Threats**
Significant interest from internal & external customers A developing manufacturing sector in Transylvania Good external image of Romanian specialists (IT)	Intense competition from bug players on the market High and unstable fixed costs in Cluj-Napoca (especially rent) European structural funds delayed considerably

Figure 1 – SWOT analysis concerning the studied company

Based on this analysis, we proposed the use of the PEST diagram that allowed the team to better focus their ideas and launch a problem-solving process (Figure 2).

Political factors	**Economic factors**
Big companies don't make easy outsourcing decisions Most companies in industrial parks or outside of Cluj Investment strategies postponed or cancelled	Tax code undergoing too many revisions and changes Funding applications become obsolete before funding High costs of doing business (taxes, banks, etc.)
Technical factors	**Social factors**
Equipment and software with expensive maintenance Very fast evolution of technologies in the field Frequent interfacing or communication issues	The work team is not complete or consolidated Conflicting views on work-life balance among company members Very high time commitment necessary for the start-up

Figure 2 – PEST analysis concerning the studied company

As it can be seen, the second analysis has permitted a more accurate formulation of the problems that the company faces and based on this some solutions have already been developed and are being implemented. For example, two important partnerships have been established with similar start-up companies, to support each other with services. One of the companies is computer repair and network structure developer, while the other is a project management consultancy company.

In the second part of the analysis, the attention was turned to practical processes, such as the customer complaint handling which was considered to be inefficient by the company. We assisted them to describe the process in detail using a simple flowchart to represent the main stages, without the smaller decision points (Figure 3).

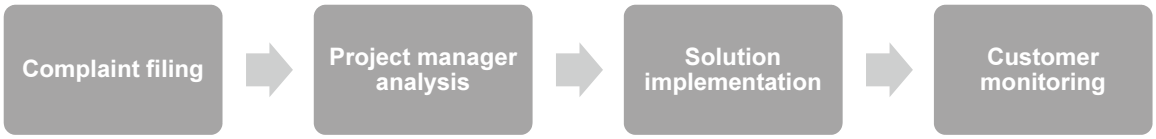

Figure 3 – Flowchart of the customer complaint handling process

Suppliers	Inputs	Process	Outputs	Customers
Customer contact person	Description of nonconformity	*Incoming customer complaint*	Formal acknowledgement	Company representative
Company representative	Formal acknowledgement Description of nonconformity	*Notification of management*	Initiation of the company response Investigation of possible liability	Company management
Company management	All available information internal and from the customers	*Interdepartmental analysis*	Causes of non-conformity, corrections and corrective actions	Company management
Company management Company representative	Solution implementation plan	*Customer analysis and approval*	Formal approval or request for modifications	Customer contact person
Company representative	Final solution implementation plan	*Solution implementation*	Feedback from the process	Customer contact person Customer beneficiaries
Customer contact person	Implemented solution	*Communication with customer for validation*	Assessment of the impact produced	Company representative
Company representative	Generated documentation	*Archiving of solutions / documents*	Archived solution and documentation	Company representative

Figure 4 – SIPOC diagram of the customer complaint handling process

Two important contributions came out of replacing the flowchart with a SIPOC diagram and analysis. First, the process became clearer and more detailed, with some previously combined activities being given more attention (formal notification of the complaint, extended analysis with all departments/persons and two-step customer engagement). At the same time, the need for further improvements was revealed and is being implemented: the adoption of an online ticketing system for registering complaints, the initiation of a knowledge base for further refinements to the established solutions, the proposal of and 8D documented problem-solving algorithm as the main backbone of the process.

In the third part of the case study, a particular instance of a problem detected through a customer complaint analysis was analyzed in two ways, first using the simple 5 Whys technique and then using a more detailed Ishikawa, or fishbone, diagram. The first method is presented in Figure 5 below and highlights the traceability of the non-conformity from a technical customer complaint to an insufficiently prepared management team.

Complaint based non-conformity	The structural integrity of the 3D printed mock-up is insufficient and does not fit the intended application
1st Why	The walls are too thin, and the internal support structure is
2nd Why	The parameters of the 3D printer used have been modified from the default ones
3rd Why	The printer is new, and the user is not familiar with its characteristics
4th Why	The company is a start-up and had the opportunity to purchase a discounted printer
5th Why	The development strategy and business plan do not match capability and equipment

Figure 5 – 5 Whys method applied to investigate a complaint

In the improved analysis, a larger scope of the discussion became apparent based on the fixed directions of the Ishikawa diagram and, although an additional step of identifying the root cause is necessary, the map of issues discovered proved to be more valuable to the company. The causes, sub-causes and relationships revealed will be integrated into the improvement strategy to eliminate possible future problems and glide towards a prevention strategy. The downside is represented by the focus on technical issues, and as such our recommendations would be to combine the methods during use.

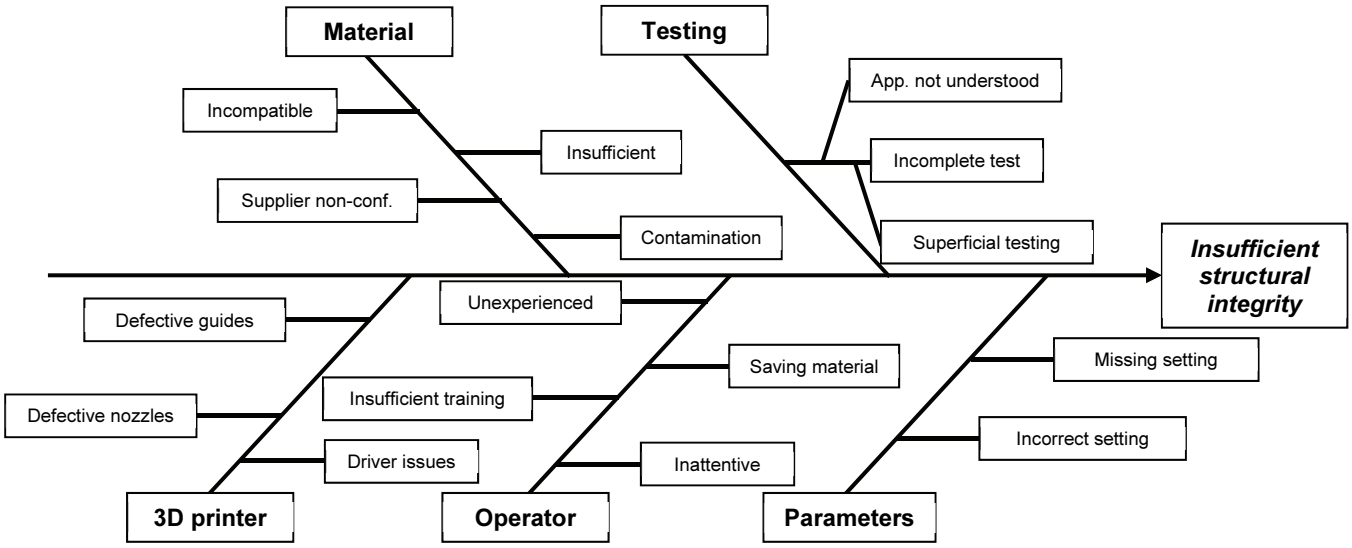

Figure 6 – Ishikawa diagram applied to investigate the same complaint

Conclusions

In order to analyze the package proposed, the authors had a discussion with the start-up members and documented the results in the form of an evaluation table. Four analysis criteria were agreed upon and the employees graded each one of these on a scale from 1 to 10 (Figure 7).

Criteria	SWOT	PEST	Flowchart	SIPOC	5 Why	Ishikawa
Complexity in use	3	6	4	7	4	8
Learning curve	3	3	6	9	5	9
Applicability and impact	5	8	7	9	8	10
Personnel feedback	7	8	10	8	9	8

Figure 7 – Ishikawa diagram applied to investigate the same complaint

We consider that the results of this assessment can be used by other companies with similar characteristics to make an informed decision in the case of their own “toolboxes” for improvement.

References

Igartua, J.I. and Markuerkiaga, L.
2017
"Application of Innovation Management Techniques in SMEs: A Process Based Method." In Viles E., M. Ormazábal and A. Lleó (eds.) Closing the Gap Between Practice and Research in Industrial Engineering. Lecture Notes in Management and Industrial Engineering: 67-74. Springer, Cham.

KeysFin
2017
"Situația IMM-urilor din Romania 2013-2016", https://congres.cafr.ro/wp-content/uploads/2017/11/4_8_CAFR-Prezentare-Short-version.pdf, accessed on 29.07.2018

Rostamkalaei, A. and Freel, M.
2017
"Business advice and lending in small firms." Environment and Planning C: Politics and Space, 35(3):537-555.

Wang, Y.
2016
"What are the biggest obstacles to growth of SMEs in developing countries? – An empirical evidence from an enterprise survey." Borsa Istanbul Review, 16(3): 167-176.

Wong, W.P., Tseng, M.L. and Tan, K.H.
2014
"A business process management capabilities perspective on organisation performance." Total Quality Management & Business Excellence, 25(5-6):602-617.

New Challenges in Performance Management

A STUDY ON CREATIVE ENTREPRENEURS TRAINING NEEDS ASSESSMENT

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Abstract

Purpose *– The article presents the research on training needs assessment in the case of a group of Serbian and Romanian young people that have the interest to act as creative entrepreneurs in cultural or creative industries.*

Methodology/approach *- A combination of techniques (individual portfolio presentation and a survey based on a defined questionnaire) for the characterization of creative entrepreneurs training needs assessment has been applied.*

Findings *– Findings of the research refers to the intercultural group characteristics related to the entrepreneurship skills development.*

Research limitations/implications *– The research development, context and results are limited to the defined research sample (40 young subjects from which 25 were Romanian and 15 were Serbian) of young artists of the Banat Area.*

Practical implications *– The research results have contributed to the refinement of the training program for creative entrepreneurship developed, in the context of a Romania-Serbia cross-border project.*

Originality/value *– The research is an innovative one (because of the techniques mix used in the investigation) and it is the first one develop with the involvement of young creative entrepreneurs. The research results contributes to the knowledge development in the field of training needs assessment and of creative entrepreneurship development.*

Key words: *Creative entrepreneurship, InclusiveArt project, training needs assessment.*

Introduction

The literature studying entrepreneurship are increasingly interested in the context in which entrepreneurship takes place (Hindle, 2010; Wright and Marlow, 2012; Williams and Vorley, 2015; Parkinson et al., 2017). Traditionally, researches in the field have focused on individual characteristics, talents and behaviors in an effort to investigate who the entrepreneur is. The present approach context refers to the entrepreneurs acting in creative or cultural industries and thus, learning and business behavior of these people has to consider that *autonomy* plays a central role and that the *personal drive of entrepreneurs* is a key success factor. These type of entrepreneurs (or sometime called "culturepreneur") may be somewhat different from those in other industries as they may be less concerned with providing solutions to the needs and wants of consumers when deciding on the characteristics and constructing the quality of the delivered product or service. According to the literature, there have been considered that *localized passion* and *passion for work* are antecedents for inspiration in the processes of new creative products and services development and the creative entrepreneurs have to show that their passion is contagious and inspiring other people or communities (Fillis and Rentschler, 2010; Hagoort and Thomassen, 2012; Bujor and Avasilcai, 2014).

Starting from these particularities of the cultural entrepreneurship, the presented research will answer the following questions: Which are the training needs of the artists, musicians, dancers, media producers etc. that have to be considered to design an efficient and effective training program in the field of entrepreneurship? How can creative entrepreneurs be educated?

The research context is liked with the Romania-Serbia cross-border project entitled "*InclusiveArt – Access to Culture for Disadvantaged Children and Youth*". It has been developed in a dynamic partnership formed by two non-governmental organizations (Intercultural Institute Timisoara and "Nevo Parudimos" from Resita, both in Romania), one local Public Authority (the City Hall of Zrenjanin in Serbia) and one Public cultural institution (Centre for Fine and Applied Arts Terra, Kikinda in Serbia). In this cross-border project, a Creative Entrepreneurship Training Program has to be designed (created and implemented in English language) and it plans to help young potential entrepreneurs, from the Banat Area (located both in Romania and Serbia), to meet the needs for developing disadvantaged communities. Finally, trainees have to create commercially viable (self-sustaining) projects/businesses, from a creative idea by means of a six days training course for a group of 40 people aged 18 to 35. A team of academics and training professionals has delivered the training; they belong to Politehnica University Timisoara and the Intercultural Institute Timisoara, in Romania.

Before the design and implementation of the Creative Entrepreneurship Training Program, a training needs assessment has been developed with the potential trainees of Romania and Serbia that were interested to be involved in the project. Furthermore, the proposed approach for the training needs assessment, within the context of the above described project implementation, aims to support the definition of the structure and the content of the Creative Entrepreneurship Training Program. The article consists of: (1) description of the approach and the methodology; (2) the research results and debate; (3) finally, conclusions and recommendations.

The Research Approach and Methodology

In the literature, training needs assessment is described as a systematic process that has to be conducted before each training program with the potential participants that will be enrolled. By gathering the opinions and information from the future trainees there could be determined (Silberman, M. L., and Auerbach, 2006; Andrew et al., 2006; Dahiya and Jha, 2011):

- The individual motivation for being enrolled in the training program;
- The degree of knowledge in the field of each courses or modules that are planned to be included in the program;
- The potential participants experience in the field of the program (personal experiences, practical knowledge in using specific methods and tools etc.);
- The most adequate training methods (e. g., combining theoretical knowledge with practical sessions);
- The ways that the participant support have to be provided in solving problems, exercises or in delivering the practical work;
- The use of the local context to adapt the schedule or content of the training program.

In the research approach, there have been collected and analyzed information about several needs assessment techniques to decide on the most adequate one. In addition, there have been suggested that some existing techniques can be easily combined in order to increase the effectiveness and efficiency of the process. As mention and analyzed by Silberman and Auerbach (2006, 32-34), the main needs assessment techniques are: observation, questionnaires, key consultation, print media, interviews, group discussion, tests, records, reports, and work samples.

In the present research context, there have to be followed the pre-defined phases of the *InclusiveArt* project. Before the training needs assessment and analysis, there have been selected and recruiting the participants (defining the target group of the project) and there have been developed a first draft of the training program curriculum. The main research objectives that has been followed were:

- To identify the participants' expectations regarding the training program;

- To assess the relevance of the suggested curriculum and the competences of the participants (how the proposed training topics or subjects meet the trainees needs for entrepreneurship development);
- To assess trainees familiarity with adult training and blended learning programs;
- To evaluate the participants' opinions about aspects related to the logistics of the training (organizational aspects of the training program implementation).

First, there have been developed the activity of selection and recruiting the potential participants in the target group of the project by dissemination activities in the Banat Area (in Romania and Serbia) related to the *InclusiveArt* project activities and founding opportunities for young artists. Potential participants have to register themselves on the on-line platform developed for this purpose and to fill-up a preliminary form by providing information about their backgrounds and their activity in the creative industry, together with a motivation letter of being involved in the *InclusiveArt* project activities. As results of this activity, 40 young artists have been recruiting (25 of them were Romanian and 15 Serbian). The main drivers that motivated the participants to enroll were:

- The interest on becoming better as an entrepreneur;
- The set of covered topics/competences;
- The opportunity for having a job;
- Application of knowledge acquired during the program; the offering support in implementing the trainees visions into reality;
- The skills and competences development which are different but complement with those achieved during the previous cultural or art education;
- Engaging with like-minded creative professionals;
- The thought that they could improve the connection between art and business;
- Achieve knowledge to promote themselves in the world of art.

In addition, the recruited trainees had to present their talent by using media files, photos or freestyle descriptions of their work and experiences in the cultural or creative industries. These materials has been upload on the same on-line platform (The Virtual Campus, www.cv.upt.ro developed under the Moodle platform of Politehnica University of Timisoara, Romania). The individual portfolio of each young artist has been of great usefulness not only for the selection and recruiting phase but later, for the interpretation of the survey's results, to better understand the training needs.

In the second phase, the project team members and the trainers have discussed and agreed on the proposed modules (and their brief description): (1) Creative Entrepreneurship – Context and several case studies; (2) Project management; (3) Starting a business; (4) Business management; (5) Communication; (6) Marketing of Arts; and (7) Digital competences. These were considered a "must know" by the project management team and the trainers team must detailed them with appropriate topics and to investigate their relevance for the participants and their competence to adjust the extent and depth of the respective topics within each module structure.

Third, a straightforward methodology (combine techniques) for the training needs assessment was suggested and that consists of: a survey based on a defined questionnaire and a focus group, for collecting additional data on the specific training needs and trainees expectations. The individual portfolio delivered by each trainees was used to refine the research results and the content of each training program modules. The survey was developed on-line (using the dedicated section for the *InclusiveArt* project together with the facilities offer by the Virtual Campus); 35 trainees were participated in the survey, their answers to the designed questionnaire being valid for the data process (from the total people in the target group of 40 young artists). On January 26, 2018, a focus group has been organized with several trainees and the trainers team and there have been discussed the results of the survey and other perspectives of the participants regarding the training program.

The questionnaire used in the survey has been structure in two parts: first, a group of questions designed to collect the demographic characteristics of the sample together with subjects' characterization on their English language skills. The second part of the questionnaire was dedicated to data collection about the "relevance" of the proposed training topics (on each module) and the

subjects opinions or "perceived competence" level regarding the seven modules covered by the training program. In the assessment process of "relevance", there have been used a Likert scale with five points (5 - very important, …, 1 – irrelevant or very unimportant), and for the assessment process of the "perceived competence" a Likert scale with six points has been used, too (5 – excellent, very competent, …, 1 – no competence).

In the case of each training module, the responds obtained were centralized and process using Excel application facilities. For each proposed topic (of each module), based on the collected responds, the weighted average have been calculated in the case of "relevance" and "perceived competence". For each training module there have been calculated the total score of "relevance" and "perceived competence" as the arithmetic mean of the weighted averages calculated for all proposed topics.

Before looking at the data, there should be underlined that they only reflects the participants' self-assessment. This means that we should not conclude that these are objective evaluations, but just participants' perceptions and opinions influenced by a social effect (to declare what they think it is safe for maintaining an image of both important and educated persons). They also give a relative indication about what topics will motivate and demotivate certain participants. Therefore, we cannot discuss the figures in absolute values, just in relative ones. We believe that the most significant information is the difference between the "relevance" of a certain topic and the "perceived competence". Theoretically, this was linked and approximate "the knowledge gap" the training program is supposed to cover. The bigger the difference (because of the large number of participants that indicate a significant difference), the more important will be to cover that respective topic by the training (materials) content. This has been demonstrated by the knowledge gap analysis that has been done for each suggested topics, using the difference between the weighted averages that have been calculated for "relevance" and "perceived competence".

Research Results and Debate

The research sample demography (related to gender, age, participants' resident, and English language skills) has shown that the created cross-cultural target group (of young artists) that has a balanced structure, which members having a strong motivation to participate in the *InclusiveArt* project activities (individual interests were well balanced with the project interests and objectives). All respondents have good English language skills (reading, writing, speaking), which have been considered as a good "ground" for building entrepreneurial competences through the proposed training program.

In the following there will be analyzed the survey results in the case of each module of the training program. In Table 1 there have been centralized the calculations done using the responds obtained. The debate of the research results have include some final remarks and recommendations for the trainers and the training materials development, as they were delivered during the focus group session.

Table 1. The research results

	Relevance	**Perceived com-petences**	**Gap analy-sis**
Module 1 - suggested topics			
Encouraging collaboration among fellow colleagues to achieve results	4.485	4.0856	0.4
Selecting the appropriate techniques for analysis	4.314	3.342	0.971
Analyzing the environment	4.657	3.3423	1.314
Expected impact	4.371	3.628	0.742
TOTAL	4.457	3.6	0.857
Module 2 - suggested topics			
Establishing and monitoring goals and objectives	4.542	4.057	0.485
Setting up and monitoring timeframes and plans	4.571	3.685	0.885

Taking appropriate and timely action to overcome unexpected hurdles or obstacles to a plan or project	4.514	3.457	1.057
TOTAL	4.542	3.733	0.809
Module 3 - suggested topics			
Understanding and seeking to achieve the company's mission and values	4.628	3.514	1.114
Responding to a changing organization	4.200	3.114	1.085
Identifying opportunities and evaluating risks.	4.457	3.142	1.314
Understanding the legal position of the firm and the various rights and obligations that come with it	4.342	2.685	1.657
Understanding the role of national and business cultures on the firm's activities and how one can exploit these	4.314	2.771	1.542
TOTAL	4.388	3.045	1.342
Module 4 - suggested topics			
Conducting regular meetings with direct reports to discuss performance and achievement of objectives	4.514	3.285	1.228
Encouraging teamwork and collaboration as a method to accomplish tasks and achieve objectives	4.600	3.742	0.857
Aligning resources to meet the business needs of the company	4.485	2.942	1.543
Understanding the costs. Profits, margins and added value and how those contribute to the success of the company	4.685	2.8	1.885
Looking at the "big picture" of the company's goals, rather than the individual department's needs	4.342	3.485	0.857
Interpreting financial data, reports, balance sheets and cash flow analysis	4.485	2.285	2.200
Recognizing and rewarding people for doing their best	4.685	3.657	1.028
TOTAL	4.542	3.171	1.371
Module 5 - suggested topics			
Understanding clear and assertive communication skills and how they create rapport and trust	4.800	4.057	0.742
Conducting effective and efficient meetings	4.685	3.885	0.800
Listening carefully, actively	4.828	4.257	0.571
Expressing loyalty and dedication to the company in interactions with others	4.571	4.285	0.285
Constructively receiving criticism and suggestions from others (feedback)	4.771	4.142	0.628
TOTAL	4.731	4.125	0.605
Module 6 - suggested topics			
Understanding who the customer is and communicating that priority consistently	4.514	3.571	0.942
Becoming effective in satisfying the customer’s needs	4.657	3.657	1.000
Pursuing the best customer-focused responses that add value to the business	4.457	3.114	1.342
Generating alternative solutions to problems and challenges.	4,657	3.628	1.028
The “seven Ps”: Product, Price, Place Promotion, Packaging, Positioning and People	4.571	3.028	1.542
TOTAL	4.571	3.400	1.171
Module 7 - suggested topics			
Understanding how to use and distribute information in the digital world	4.514	3.457	1.057
Using effectively digital information and understanding its privacy, security and intellectual rights	4.571	3.171	1.400
Becoming confident in using digital online and mobile tools needed for management, communication and marketing	4.571	3.200	1.371
Generating creative / cultural/ artistic/ heritage artefacts by using digital tools	4.542	2.942	1.600
TOTAL	4.550	3.192	1.357

Module 1 – Creative Entrepreneurship – Context and several case studies

1.1 Encouraging collaboration among fellow colleagues to achieve results;
1.2 Selecting the appropriate techniques for analysis;
1.3 Analyzing the environment;
1.4 Expected impact.

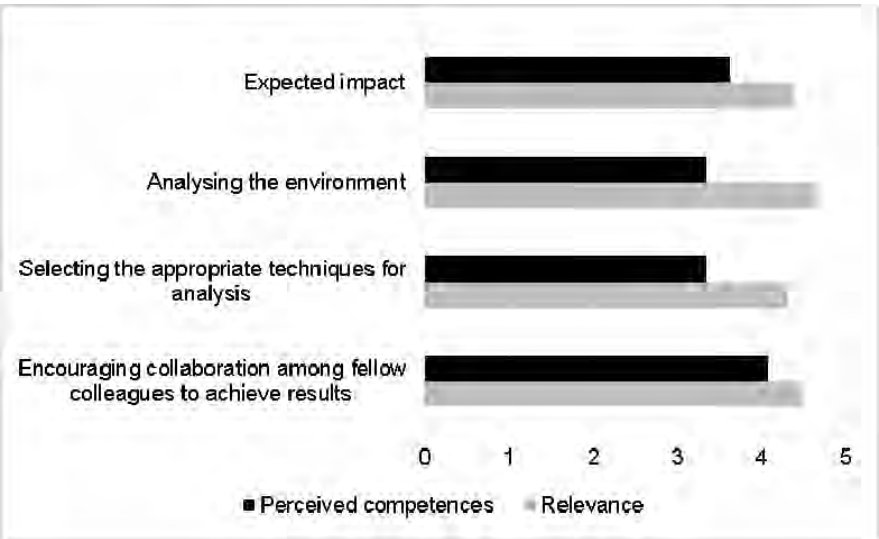

Fig. 1. Research results in the case of Module 1 topics (Creative Entrepreneurship)

As there can be seen from Figure 1, most of the trainees consider all subjects quite relevant and, express their need for applicability, case studies and examples of good practices are highly appreciated. Some respondents suggested other topics as examples of bad practices or failed businesses and business models behind successful creative entrepreneurs.

Module 2 - Project management

2.1 Establishing and monitoring goals and objectives;
2.2 Setting up and monitoring timeframes and plans;
2.3 Taking appropriate and timely action to overcome unexpected hurdles or obstacles to a plan or project.

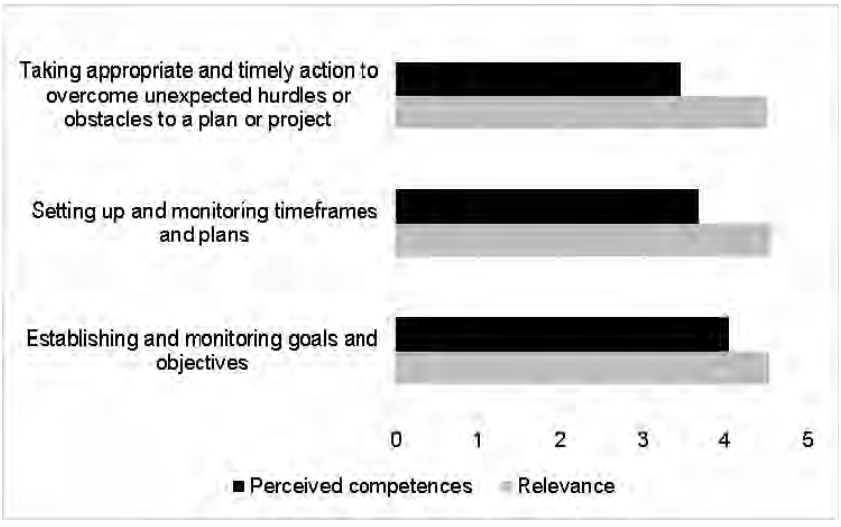

Fig. 2. Research results in the case of Module 2 topics (Project management)

The answers given by the respondents (see Figure 2) have underlined that, all topics are deemed highly relevant (Figure 2), but roughly one third of the participants claim they are quite competent this field. As a general recommendation for designing the training structure, content and the training strategy in this case, there have to be included more applications and exercises, and the trainer has use (by applying a collaborative teaching and learning strategy) more the knowledge of those participants having experience in the field of project management. This has to be considered a knowledge resource for the established training group.

Module 3 - Starting a business

3.1 Understanding and seeking to achieve the company's mission and values;
3.2 Responding to a changing organization;
3.3 Identifying opportunities and evaluating risks;
3.4 Understanding the legal position of the firm and the various rights and obligations that come with it;
3.5 Understanding the role of national and business cultures on the firm's activities and how these can be exploited.

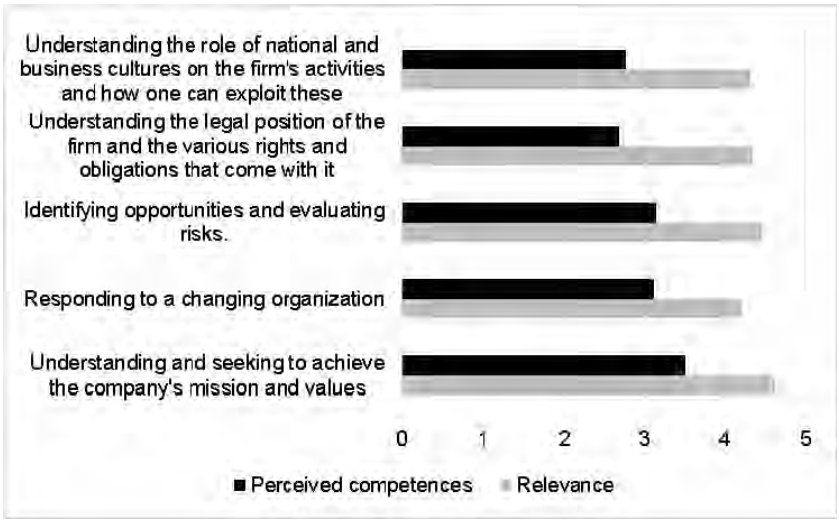

Fig. 3. Research results in the case of Module 3 topics (Starting a business)

The results represented in Figure 3 shows that the proposed topics 3.4 and 3.5 received a high “relevance” mark from fewer participants (still well over 50%), but in the same time their assessment of “perceived competence” is quite low, as it is depicted in Figure 5. This means that lacking clear notions they are less likely to correctly asses its relevance. From these research results, there have been strongly recommend to the trainer to keep the module structure as suggested (by the 3.1 to 3.5 topics). In addition to this aspect, some respondents have suggested additional topics to be included as positive impact of the business (on different stakeholders) and additional knowledge regarding the legal framework of start-up (in Romania and Serbia).

Module 4 - Business management

4.1 Conducting regular meetings with direct reports to discuss performance and achievement of objectives;
4.2 Encouraging teamwork and collaboration as a method to accomplish tasks and achieve objectives;
4.3 Aligning resources to meet the business needs of the company;
4.4 Understanding the costs, profits, margins, and added value and how those contribute to the success of the company;
4.5 Looking at the "big picture" of the company's goals, rather than the individual department's needs;
4.6 Interpreting financial data, reports, balance sheets, and cash flow analysis;
4.7 Recognizing and rewarding people for doing their best.

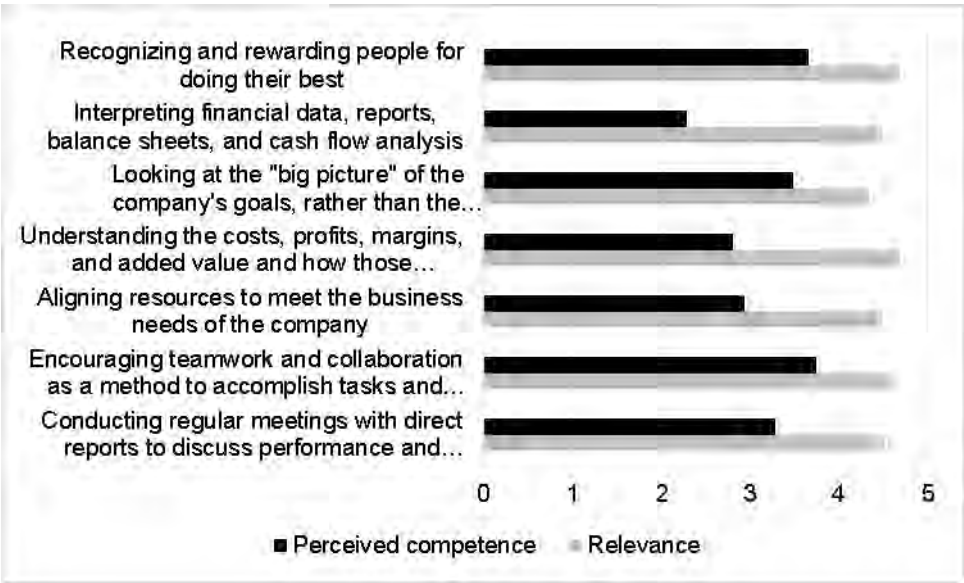

Fig. 4. Research results in the case of Module 4 topics (Business management)

The research results presented in Figure 4 demonstrate that respondents recognize a high “relevance” on the proposed topics. Young artists included in the research sample have recognize a big knowledge gap, in relation to their “perceived competencies”, on topics 4.4 and 4.6. Other suggested topics related to this module were promoting moral values and conflict resolution (or conflict management).

Module 5 - Communication

5.1 Understanding clear and assertive communication skills and how they create rapport and trust;
5.2 Conducting effective and efficient meetings;
5.3 Listening carefully/actively;
5.4 Expressing loyalty and dedication to the company in interactions with others;
5.5 Constructively receiving criticism and suggestions from others (feedback).

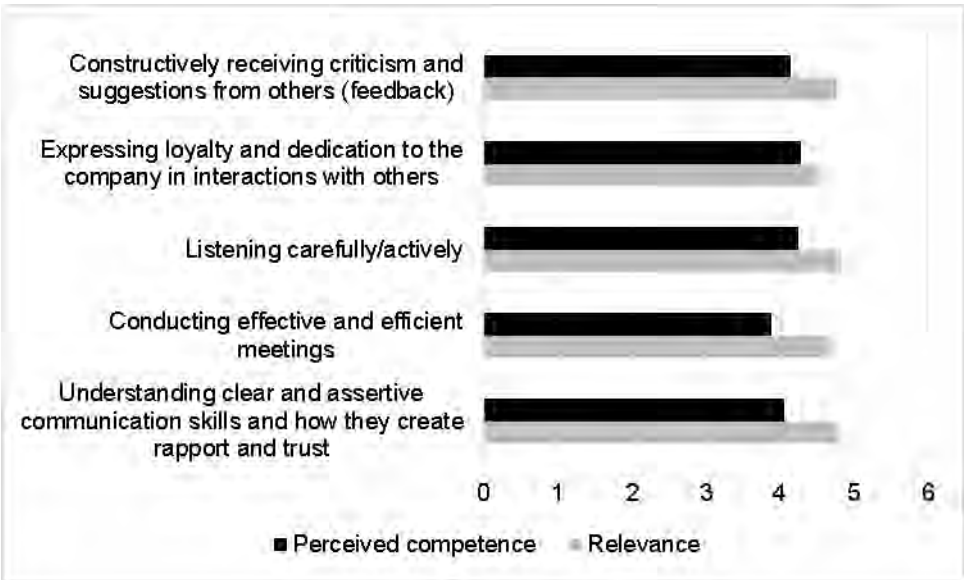

Fig. 5. Research results in the case of Module 5 topics (Communication)

As shown by the research results present in Figure 5, respondents rate all topics of the "Communication" module as relevant. Furthermore, they rate themselves in rather high numbers as having high competences in this filed. This means that knowledge related to communication needs to be personalized and delivered in an interactive manner and the proposed 5.2 topics seems to be extended (high score in the gap analysis).

Module 6. Marketing of Arts

6.1 Understanding who the customer is and communicating that priority consistently;
6.2 Becoming effective in satisfying the customer's needs;
6.3 Pursuing the best customer-focused responses that add value to the business;
6.4 Generating alternative solutions to problems and challenges;
6.5 The "seven Ps": Product, Price, Place, Promotion, Packaging, Positioning and People.

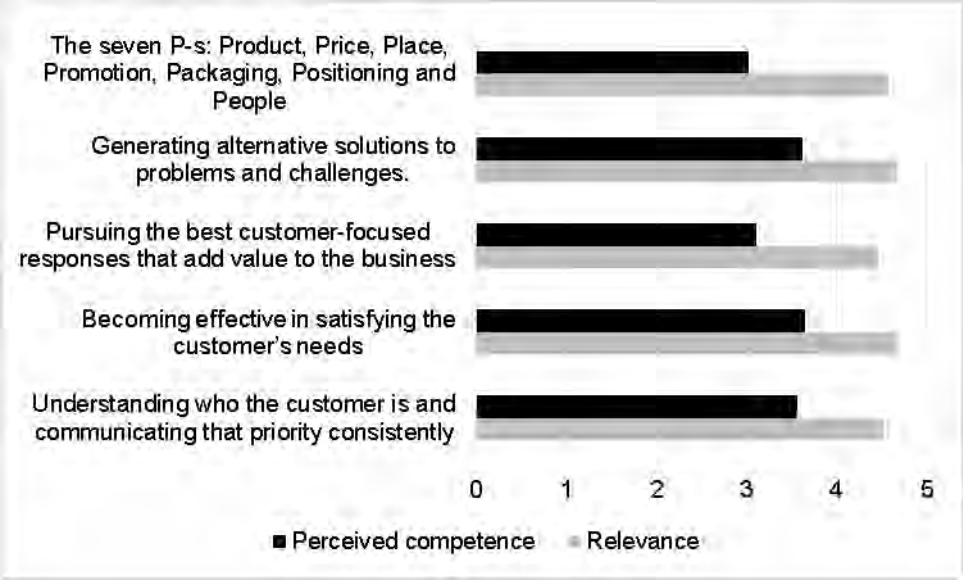

Fig. 6. Research results in the case of Module 6 topics (Marketing of Arts)

Figure 6 is showing the research results related to the proposed topics of Module 6. Overall, the respondents recognize the high relevance of this module for their entrepreneurship activity, but their opinion on the "perceived competence" are of average (on the considered Likert scale). No other topics were suggested for this module but the trainers has to deliver a comprehensive material (including structured knowledge) on each topics. Case studies and examples could be valuable tools to determine trainees in being efficient and effective in the process of knowledge acquisition. This could support the knowledge application (exploitation) in the case of their business plans or projects.

Module 7. Digital competences

7.1 Understanding how to use and distribute information in the digital world;
7.2 Using effectively digital information and understanding its privacy, security and intellectual rights;
7.3 Becoming confident in using digital online and mobile tools needed for management, communication and marketing;
7.4 Generating creative, cultural, artistic, heritage artefacts by using digital tools.

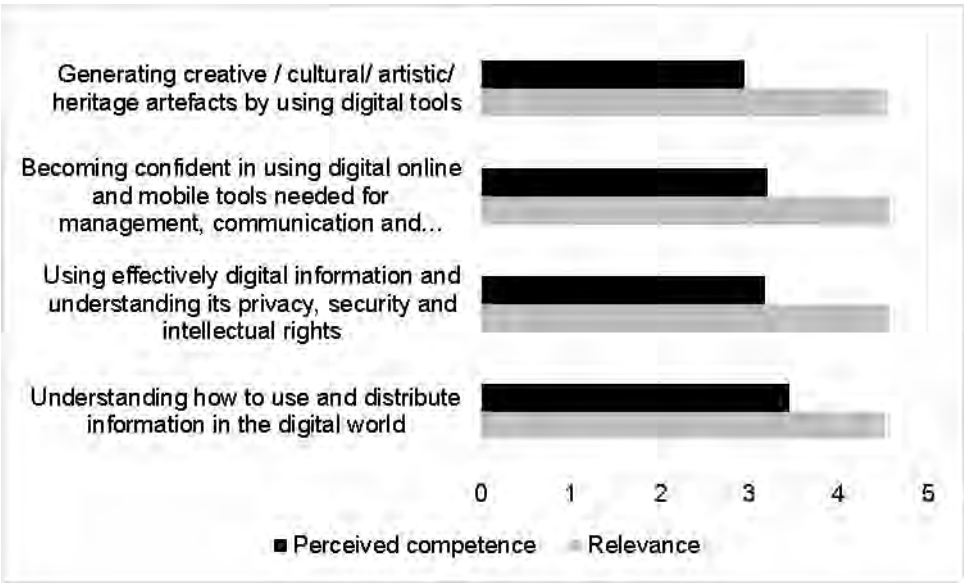

Fig. 7. Research results in the case of Module 7 topics (Digital competences)

From the chart related to the research results in Figure 7, there can be seen that all respondents consider all the topics of this module of utmost "relevance", and the "perceived competence" of the majority does not exceed the average level, as it was stated later in the focus group discussions. The research results in this case are similar to those achieved in the case of Module 6. The recommendations for trainers are related to the use of case studies, examples and demonstrations of the digital tools (paying attention to the selection of the most important one for entrepreneurs operating in the cultural or creative industries) and the training material should be demonstrations and user guide of these selected digital tools. These were confirmed by the discussions during the focus group.

Conclusions and Recommendations

The main findings of the research on the training needs assessment of young artists involved in the *InclusiveArt* project are:

1. The group involved in the research consists of 40 persons, representing two countries (Romania and Serbia), from five administrative entities interested in various creative industries. The most relevant characteristics of the group are: youth; balanced gender structure; unemployed. In our view, the main implications of this structure for the training process could be the high degree of motivation and willingness to apply the acquired competences;
2. More than 94% of the respondents (group members) understands and speaks English at a level considered adequate for the requirements of the training program;
3. Although only a few of the participants previously attended similar training courses, it is probable that they expect modern teaching approaches. All participants would like the training approach to be interactive and very pragmatic. They would like to get answers to their questions and solutions to their problems. They would like to have any examples and to share experiences. Here we can observe that participants' expectation meet the principles of adult learning. All trainers are briefed and required to comply with this expectations;
4. There is a rather low level of experience of participants regarding their practical knowledge for starting and running a business, but a great willingness to experience and apply as many of the advice and guidance received during this program;
5. The assessment results have indicated that the suggested curriculum (the established modules) is considered very relevant and relevant by the clear majority of the respondents and that there were no alternative topics suggested by the participants, we have recommended considering the suggested curriculum as a valid starting point.
6. "Digital Competences", "Marketing of Arts", "Project Management" and "Communication" seem to be the topics most "relevant" for the participants. It seems that these modules will benefit from

more attention from the young artists but also from higher expectations. In the same time, we believe that the modules with the lowest priority level (”Starting a Business” and ”Business Management”) should be very carefully prepared to get the deserved attention from the participants. These modules of the training were those with the lack of knowledge and experience.

7. Participants have very few specific expectations and suggestions regarding the training topics, structure and organisation. Most of them are just interested in gaining new competencies, which are expected to be rather valuable in the context of starting their own business or venture.
8. There were no major differences between the Romanian subjects answers and comments and the Serbians. That is why the research results do not analyses the responds by taking into consideration the demographic variable of nationality. Furthermore, the main interest of the researchers were to characterize the whole group regarding the training needs to inform trainers on the training and learning strategy that should be adopted, about the most needed or relevant topics that should be presented in the learning materials, teaching process etc.

The proposed approach (and the associated methodology) for the training needs assessment could be applied before any training program in the field of creative entrepreneurship development. The motivation could be that a potential user could benefit from an already designed and tested mix of techniques that consists of a survey based on a proposed questionnaire, a focus group session and subjects' individual portfolio analysis. We consider the questionnaire as a reliable tool for capitalizing the training needs. The proposed schema for the data processing can delivered quick and easy to interpret results for trainers in order to adjust their modules or courses content. Overall, the proposed approach can contributed to the increasing of the training program effectiveness and efficiency.

The dimension of the sample and the specific context of the research (a cross-cultural group of Romanian and Serbian) determine the limits of the research. Furthermore, the presented research could also contributes to the extension of the knowledge pool in the field of training need assessment and analysis.

Notes

Authors are grateful to all the trainees and the trainers involved in the Creative Entrepreneurship Training Program developed in the context of the cross-border project Romania-Serbia, entitled "*InclusiveArt – Access to Culture for Disadvantaged Children and Youth*" (RORS-22 nr 414/01.11.2017) and that accept to be involved this research.

References

Andrews, D. A., J. Bonta, and J. S. Wormith
2006
"The recent past and near future of risk and/or need assessment." Crime & Delinquency, *52*(1): 7-27.
Bujor, A. and S. Avasilcai
2014
"Creative Entrepreneurship in Europe: A Framework of Analysis." Annals of the Oradea University. Fascicle of Management and Technological Engineering, 151-156.
Dahiya, S., and A. Jha
2011
"Training need assessment: A critical study." International Journal of Information Technology, 4(1): 263-267.
Fillis, I., and R. Rentschler
2010
"The role of creativity in entrepreneurship." Journal of Enterprising Culture, 18(01): 49-81.
Hagoort, G., and A. Thomassen
2012
Pioneering minds worldwide: On the entrepreneurial principles of the cultural and creative industries: Actual insights into cultural and creative entrepreneurship research: 152-181. Eburon Uitgeverij BV.
Hindle, K.
2010
"How community context affects entrepreneurial process: A diagnostic framework." Entrepreneurship and regional development, 22(7-8): 599-647.

Parkinson, C., C. Howorth, and A. Southern
2017
“The crafting of an (un) enterprising community: Context and the social practice of talk.” International Small Business Journal, 35(4): 385-404.
Silberman, M. L., and C. Auerbach
2006
Active training : a handbook of techniques, designs, case examples, and tips. San Francisco: Pfeiffer.
Williams, N., and T. Vorley
2015
“Institutional asymmetry: how formal and informal institutions affect entrepreneurship in Bulgaria.” International Small Business Journal, 33(8): 840-861.
Wright, M., and S. Marlow
2012
“Entrepreneurial activity in the venture creation and development process.” International Small Business Journal, 30(2): 107-114.

A PROPOSE APPROACH FOR STRATEGIC PERFORMANCE MANAGEMENT FOR PUBLIC ADMINISTRATION ORGANIZATIONS

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Abstract

Purpose *– To demonstrate how an adapted Balance Scorecard tool can be useful for the strategic performance management in the case of public administration organizations in Romania.*

Methodology/approach *– The research approach is based on the Balance Scorecard model. To identify the key performance indicators (lead indicators and lag indicators) a propose questionnaire was designed based on the analysis and discussions with an appropriate panel of experts (using Delphi method). For the strategic performance management there has been created an Excel platform allowing the calculations, report and the analysis of the indicators.*

Findings *– The use of Balance Scorecard tool allows a continuous monitoring and the performance management during the strategic plan execution.*

Research limitations/implications *– The created Balance Scorecard tool take into consideration the specifics of the public administration organization. The created framework has to be adapted and modify for other similar organizations.*

Practical implications *– words, words.*

Originality/value *– Enrichment of the Balance Scorecard knowledge by providing a new perspective of the model exploitation in the case of public administration organization.*

Key words: *Strategy, performance management, Balanced Scorecard.*

Introduction

Romania Europeanization process has had a significant impact on the modernization of the public administration system and services, too. The legal framework is in place along with the Commissions' monitoring reports verifying the progress of the nation and the adoption of the European public administrative space. As suggested by Vaduva (2016) "the future of Romanian public administration reforms will rest on two fundamental challenges: the curbing of corruption and the generation of economic prosperity". These challenges and the whole reform process should exploit the administrative intellectual instruments available for administration reform such as the New Public Management, Neo-Weberianism, and New Public Governance. An adequate (realistic and feasible) strategic vision should choose and combine components of each and thus will be supported the national capability for producing economic prosperity (Nemec and de Vries, 2012; Van der Wal, 2015).

Furthermore, from the strategic perspective of the perspective of the public administration evolution (change management linked with performance management, in the reform context), there is an obvious need that all administrative instruments to be properly contextualized (adept and adjust) to Romania's realities (Hudrea and Tripon, 2016). However modern and efficient these tools may be, they are still inadequate and do not encompass all societal capabilities (Sorin, 2015).

From the practical perspective, public administration strategy in Romania has to achieve the establish objectives of efficiency and effectiveness, being also aligned to the Europe 2020 strategy (Dinu and Giosan, 2015). Strategic planning is an excellent tool that governments can (and should) use in the case of an efficiently change management. As change pace is exponential, thinking strategically (planning for the future) becomes a condition for both organizational survival and development (Hintea et al., 2015; Junjan, 2015). It becomes obvious that strategic thinking and planning requires the existence of development strategies and a coherent performance management plan that have to be implemented and monitor continue. The immediate benefit of local public authorities when using strategic planning is the increasing focus of major stakeholders (including local communities and citizens) and political leaders on the mission, goals and priorities of the locality, improving communication between stakeholders, better general management and decision making inside the organization, improved employee professional development and a general improvement of organizational performance.

In this context, the paper will present an approach for the strategic performance management by exploiting the Balance Scorecard (BSC) model. Due to the research thematic described in this article, in its further parts will be devoted to strategic performance management for local development perceived from the local perspective. The paper's content is structured as follow:

1. Introduction;
2. Literature review;
3. Description of the research methodology and the design of the adopted BSC model;
4. The case study though which the BSC proposed methodology (and the associated designed tool) are tested and validated (the strategic performance management of a commune);
5. Final discussions and conclusions.

Literature Review

Governments and public administrations units need a better means of determining performance in relation to their predefined objectives. This is the subject of performance management, but it the case of public bodies the theoretical approaches that have been defined for companies or enterprises (profit oriented organizations), have to be adapted and contextualized. Kloot and Martin (2000) sustained that "performance measures have become too bountiful and too operationally focused. The result is performance measures that are overwhelming and do not always meet the needs of relevant stakeholders. Performance measurement in government is related to accountability, and inadequate performance measurement systems do not help in understanding what services are provided and to whom."

The literature has underline the link between strategic and performance management as a practical implication of their relation. The strategic planning process begins by determining the organization's primary objectives. It is through the development and articulation of primary objectives that governments establish the nexus between their organization and its stakeholders. Secondary objectives reflect the organization's strategic choices about how it chooses to pursue its primary objectives and the relationships it must have with its stakeholders to be successful in its strategic choices (Kloot and Martin, 2000). This is an important distinction in defining aspects of performance management systems and the focus on secondary processes for achieving primary objectives provides a tool for stakeholders' management.

A focus on stakeholders is evident in the classical models for performance management. Kaplan and Norton's (1992, 1996) BSC explicitly refers to shareholders, competitors and customers (Figure 1). The framework defined by Fitzgerald et al. (1991) also refer to customers and competitors. The approach research of Atkinson et al. (1997) refer to environmental stakeholders: customers, owners and the community, and process stakeholders: employees and suppliers. Environmental stakeholders are concerned with primary objectives, which in the public sector is value-for-money service delivery. Process stakeholders are vested with the planning, design, implementation and operation of the organization to meet the primary objectives. The way in which this works in organizations is named a strategic performance measurement system (Atkinson et al., 1997).

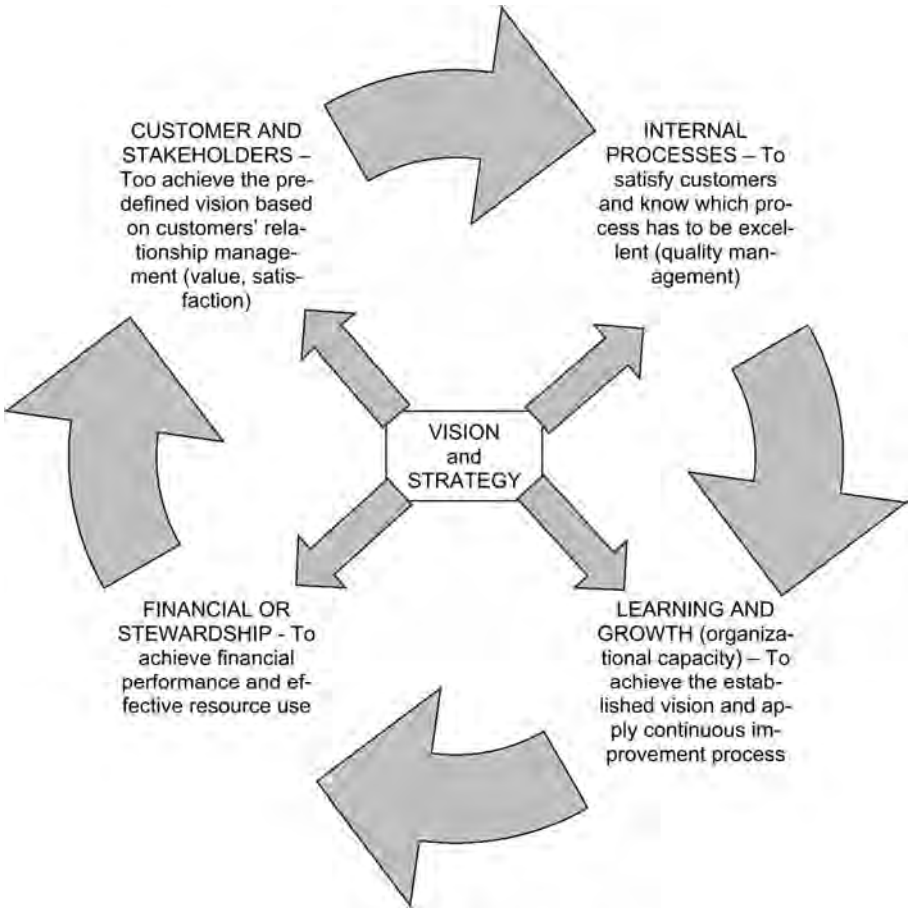

Fig. 1. Representation of the Balance Scorecard model (after (Kaplan and Norton, 1996))

From the above mention approaches, frameworks or models there can be concluded that the coordinating role of a performance measurement system is to direct and focus the attention of decision makers on results and determinants or primary and secondary objectives and associated processes. Having this in mind, employees of all categories know what is expected from them to do and the external stakeholders of the organization can determine and understand what the organization is trying to achieve (Kloot and Martin, 2000).

Kaplan and Norton (1996) approach try to explicitly link long-term strategic objectives with short-term actions and they argue that the defined Balanced Scorecard introduces four new management processes that, separately and in combination, contribute to this linkage. We question that “translating the vision”, “communicating and linking”, “business planning” and “feedback and learning” are the new management processes. From the practical point of view, by using the BSC managers are forced to use these processes in a way they have not done before.

In this new defined framework of BSC, performance management has been improved with new perspectives. Formerly, performance measurement systems was based primarily on financial performance measures having lack the focus and robustness needed for internal management and control (Atkinson et al., 1997). Kaplan and Norton (1992, 1996) have made the connection between performance, strategy and organizational purpose (vision, mission and objectives) which has been considered a more holistic perspective of the performance management and also, more challenging. In addition, Kaplan and Norton (1996) have argued that their BSC model is not a replacement for financial measures, but it is a complement helping to develop a much global imagine of the organization’s performance. During the years, BSC model has been exploited in different organizations, so confirming the utility, effectiveness of it, becoming associated with a classical approach in performance management. The Balanced Scorecard Institute (http://www.balancedscorecard.org/BSC-Basics/About-the-Balanced-Scorecard) is a real proof of the large community of users as consultants, trainers and trainees, experts and researchers.

From the perspective of our research focus (managerial purposes for using PM-practices in the local public administration organizations), in the literature, performance management in government has presented researches of strategic linkages with operational performance (Atkinson et al., 1997) and this is aligned with the approaches on performance management in general (Kaplan and Norton, 1992, 1996; Fitzgerald et al., 1991). In the '90, the literature on performance management in local government was less strategic in focus and it was largely grounded in operational concepts of efficiency, without focus on effectiveness. Later, the researchers have proposed global, holistic models of performance management, most inspired by the development of Kaplan and Norton (Kaplan and Norton, 2001; Heinrich, 2002; Verbeeten, 2008).

Methodological Aspects

Performance management is seen today as the process of defining goals, selecting strategies to achieve those goals, allocating decision rights, and measuring and rewarding performance. For this purpose, BSC is recognized as a strategic planning and management system that organizations use to: communicate what they are trying to accomplish; align the day-to-day work that everyone is doing with strategy; prioritize projects, products, and services and to measure and monitor progress towards strategic targets.

According to Balanced Scorecard Institute: "BSCs are used extensively in business and industry, government, and nonprofit organizations worldwide. Gartner Group suggests that over 50% of large US firms have adopted the BSC. More than half of major companies in the US, Europe, and Asia are using the BSC, with use growing in those areas as well as in the Middle East and Africa. A recent global study by Bain & Co listed balanced scorecard fifth on its top ten most widely used management tools around the world, a list that includes closely-related strategic planning at number one. BSC has also been selected by the editors of Harvard Business Review as one of the most influential business ideas of the past 75 years."

Based on these arguments and motivation, there have been defined the methodological approach based on the BSC model has been adapted to the Romanian public administration context. Previous analysis of Hintea et al. (2015) indicates that over 70% of strategic planning efforts in the local public administration are done because it is a mandatory condition for accessing European Union funds (e.g. Structural Founds). Major issues concern implementation, monitoring and evaluation with only around a third of organizations having a formal body responsible for this. Although the process has mixed characteristics, Neo-Weberian State type elements are more common/preferred, while New Public Management seem least common/preferred by local authorities.

It is evident that the strategic planning requires the existence of development and implemented strategy and an associated correct performance management. One of the main reason for introduction of BSC is the translation of corporate strategic priorities in directions and statements oriented on actions related to what must be done for strategy's execution. Considering that in public administration the citizen's satisfaction is the priority objective, the implementation of BSC requires to amend its original architecture because of the differences of business or operation processes between profit-oriented organizations (industrial, business or financial enterprises) and the others that are mission-oriented (public administration authorities or NGOs). These differences act, in some circumstances, as barriers against the transfer of management techniques from the private to the public sector (Bigliardi et al., 2011).

In Romanian public administration context, there is a scarcity of budgetary resources at communal level and, in the same time, a rising demand of services for citizens and community. As mention by Bigliardi et al., (2011), the adoption of efficient strategy allows the achievement of public administration's objectives, simultaneously with the transparency of the results gained [1]. Furthermore, performance management acquires an adequate leadership of the organization.

In the early version, Kaplan and Norton (1996) propose BSC model it is allowed the performance measurement by analyzing this from four standpoints (as depicted in Figure 1), also called perspectives and to develop metrics, collect data and analyze it relative to each of these perspectives. These perspectives are shown in Figure 2.

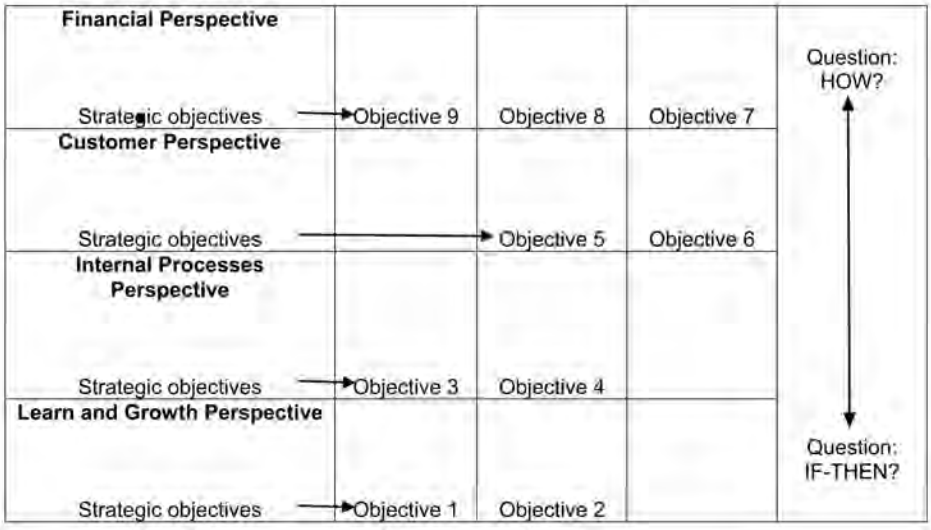

Fig. 2. The strategy mapping (Coifan and Nica, 2017)

The perspectives are inter-connected, which mean that the performance achieved in one perspective may influence the performance of the others. These relationships are schematically represented in the "strategy map". Furthermore, for each of the four perspectives there should be established: an objective (the aim of the perspective measurement), the measures (performance indicators for the objectives), the measures' target values (the value that the organization aims to reach) and the initiatives (actions that must be taken to reach the established target values). The objectives are evaluated by their performances, the measures contain key performances indicators (KPI) and key results indicators (KRI). These indicators, also known as lead indicators and lag indicators, are target values for every measure. The initiatives are referring to the actions that must be done to achieve these values.

The strategy maps are communication tools used to depict how value is created in the organization case. They show a logical, step-by-step connection between strategic objectives in the form of a cause-and-effect chain. Figure 2 shows a theoretical example of a cause-and-effect between nine objectives located in different perspectives.

By transforming and establish their strategy into a strategy map, using BSC model, organizations create a common and understandable point of reference for all organizational units and employees (Kaplan and Norton, 2001).

The strategy maps are developed by using a top-down approach. Top management team have to review first, organization's mission and vision. The vision creates a clear picture of the company's overall goal, which could be then disperse into the organizations' objectives that are the basis of the strategy formulation. The strategy implementation must be done based on tactics and measures that are formulated in a feasible practical manner.

There are significant differences between the BSC's perspectives for private organizations and public administration. Because the last is mission-oriented, past studies have proposed "mission perspective" (Coifan and Nica, 2017). In Figure 3 is shown how the "Financial" perspective become "Fiduciary" perspective in the case of public administration organizations when applying BSC model. In the research of Wisniewski and Olafsson (2004), they analyze the relevance of the perspective labels and propose to relabel some of them considering the activities' specifics of public administration organizations. Thus, a general recognized architecture for the BSC for public bodies must take into account the relationship existing between communities and public organizations.

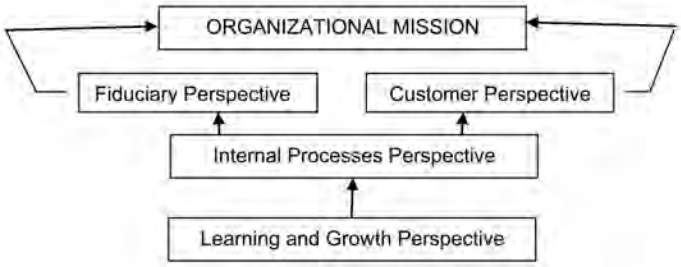

Fig. 3. The Fiduciary perspective of BSC in the case of public administration organizations

In the following chapter, the above methodological issues about how to apply BSC model in the case of public administration organizations, will be demonstrated with a case study. Additional procedural and operational aspects of the proposed approach will be detailed.

Case study – BSC model Application in the Case of a Romanian Commune

For proofing the feasibility of the proposed approach for the strategic performance management, using BSC model, there have been choose a commune located in the Timis country of Romania. The main reasons for selecting this commune were: the dynamic of the socio-economic development, the growth potential, the existence of a modern and motivated local administration. But the most important reason is the existence of an elaborated Strategic Plan of development and an Action Plan associated to the strategy's implementation. These were considered as the basis for the Strategy Map development and they support the process of the performance evaluation system implementation, too. All the necessary information for this study were extracted from the city hall website and from the interviews with mayor and local councilors of the chosen commune.

The commune is located in the Western Plain of Romania, 13.5 km far from Timisoara, the main municipality in region. It has 3310 inhabitants with a multiethnic composition: Romanians, Magyars, Germans, Serbians, Ukrainians, Rroms. There are 12 companies located in the commune area.

The research approach for the strategic performance management based on the implementation of the BSC model has followed 10 steps:

1. Vision and mission definition in the case of the local administration's (the mayor and members of the local council);
2. Definition of the organizational level at which BSC should be implemented;
3. The identification of specific strategies that should be formulated and implemented to achieve this vision;
4. Building the Strategy Map that offers a macro view of the local public administration's strategy;
5. Determination, for each perspective, of the Critical Success Factors (CSF) that contribute to the strategy's development;
6. Selection and definition of KPIs and KRIs (lead and lag indicators);
7. Definition of KPIs and their target values for each perspective;
8. Representation of KPIs with their actual values in a sort of "executive dashboard" in the order to help the strategy's responsible to supervise their actions and targets;
9. Development of the "executive dashboard" (using Excel application facilities);
10. Implementation of the BSC model, monitoring and updating the results obtained over the time.

The commune's Development Strategy for 2014-2020 represents the basic instrument for the local administration's actions to accomplish the proposed Vision for 2020. This strategy was drafted by the civil servants of the specialized compartments from the city hall in accordance with the Law's no. 215/2001 provisions. The declared vision (step 1 of the methodology) is: "Harmonious and well-proportioned sustainable development of the commune in all its sectors and functions in order to assure for citizens the best living conditions in a quality of environmental and cultural surroundings". For step 2, there have been discussed and presented the opportunity of using BSC model to the commune top-management and to the teams at the operational level.

In step 3, a two-round Delphi method was adopted. This technique is a systematic, interactive forecasting method, which allows obtaining forecasts from an appropriate panel of experts (Bigliardi et al., 2011; Kaplan and Norton, 1996). In the first round, there were identified the strategic priorities and the KPIs. A multidisciplinary panel composed by the local council executives, the county council's councilors with expertise and experts from ADETIM (the Development Agency of Timis County) was set up. There has been suggested to use KPIs in a combination between lead indicators and lag indicators. Regarding the performance measurement, the lead indicators represent predictive actions in comparison with lag indicators that represents an after-the-event measurement. When a BSC model is applied, the balance between the lead indicators and lag indicators is necessary in order to assure that the measured activities are these that offer correct results (Coifan and Nica, 2017).

The couples lead indicators (IP) and lag indicators (IR) have different meanings in the four perspectives (Bigliardi et al., 2011). Thus, as for the indicators of the "Community Perspective", they aim at ensuring that the strategy is implemented. As far as the "Internal processes Perspectives", it identifies what are the processes they must excel at in order to get desired outcomes for community. The "Financial Perspectives" entails all the resources as either enables of organization's success or constraints within which the organization must operate. The "Learning and Growth Perspective's objectives are related to the drivers of performances in other perspectives and are generally "the intangible infrastructure" that the organization use to pursue the objectives for internal processes (Bigliardi et al., 2011).

Experts in the panel has identified four strategic priorities and nineteen strategic objectives. The four priorities are: infrastructure; culture, leisure time and tourism; environment; social domain, health and education. The priorities have been described and an analysis of the functionality in order to be known by the local councilors and executives was made. The strategic objectives mapping, in the case of the pre-defined four priorities, is presented in Figure 4. Furthermore, in Figure 5 the Strategy Map (step 4) is shown and in Table 1 are presented the dynamic of the lag indicators (steps 5, 6 and 7).

	Strategic priorities			
Strategic objectives	Infrastructure	Culture, leisure and tourism	Environment	Social field, health and education
A. Development of tourism services for relaxation and leisure		■		
B. Support of new social services foundation at local level				■
C. Foundation of social enterprises for qualification and employment of young people				■
D. Stimulation of local agriproducts capitalization	■			
E. Support pomiculture network foundation and improvement of poor wooden areas			■	
F. Growth of educational services and increase the number of people involved in learning systems				■
G. Development of local transport in connection with Timisoara municipality	■			
H. Development of local infrastructure	■			
I. Urbanization of commune in a healthy environment			■	
J. Development of cultural offers				■
K. Obtaining financial resources	■	■	■	■
L. Effective financing of objectives			■	■
M. Preparation and implementation of investments	■	■	■	■
N. Support for clubs and associations			■	■
O. Improvement the quality management of the local authority and public services			■	■
P. Updating the Inner Management and Control System	■	■	■	■
Q. Increasing inter commune cooperation in the Metropolitan Zone Timisoara	■	■	■	■
R. Support of innovation and new information technologies use			■	■
S. Develop the skills and knowledge of public servants'			■	■

Fig. 4. The strategic objectives' mapping as a function of priorities

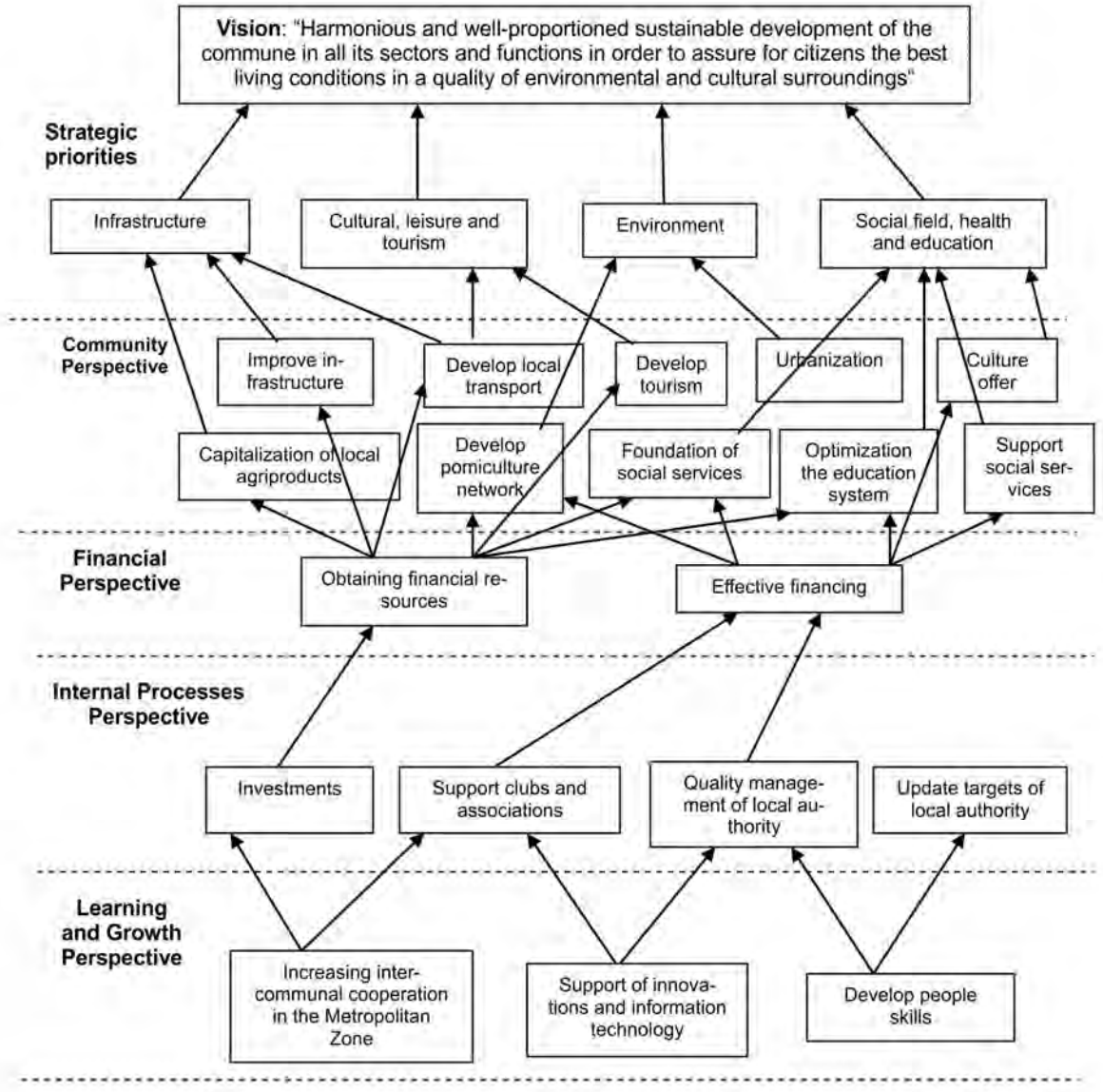

Fig. 5. The Strategy Map of the commune chosen for the case study

From the perspective of the BSC model operationalization in the case of a local public administration organization there have been designed a platform for the calculations, monitor and control of the KPIs. The acquisition of a specialized software is not justified because of the small dimension of the administrative unit, and the unavailable financial resources. In the presented research there have been used an application that has been developed using the functionalities of Microsoft Excel and PowerPoint available in MS Office.

The Strategy Map of the commune in the case study was designed using PowerPoint functionalities. The tables contained KPIs and the dashboard were developed in MS Excel application. In the literature, there are presented the advantages of using Excel functionalities for dashboards' development and implementation in the case of small and medium size companies but there is a lack of knowledge in the case of applications for public administrations' bodies.

Table 1. The dynamic of the lag indicators

Reference month: August 2017	Strategic objectives			
	Objective	**Lag indicator**	**Actual**	**Target**
***Community* Perspective**	**C1 –**Development of tourism services for relaxation and leisure time	IRC11 - no. of created locations;	2	10
		IRC12 - no. of capacity of housing;	17	250
		IRC13 - no. of eating places;	2	15
		IRC14 - no. of certified tour operators;	0	2
	C2 – Support of new social services foundation at local level	IRC21 - no. of assisted elders;	0	50
		IRC22 - no. of beneficiaries of social canteen;	0	100
		IRC23 - share allocated from the local budget;	0.1%	2%
	C3 –Foundation of social enterprises for qualification and employment of young people	IRC31 - no. of created microenterprises;	2	3
		IRC32 - no. of qualified young people and employees;	2	5
	C4 –Stimulation of local agriproducts capitalization	IRC41 - no. of places in the food market;	3	20
		IRC42 - percentage of bio food;	90%	80%
		IRC43 - no. of producers/providers associations;	2	3
	C5 –Support of fruits network foundation and improvement of poor wooden areas	IRC51 - density of wooden areas;	0.8%	5%
		IRC52 - no. of wooden hectares;	45	270
		IRC53 - no. of specialists in the field;	0	3
		IRC54 - no. of deposed projects;	1	1
		IRC55 - no. of gained projects;	1	1
		IRC56 - no. of terrain owners that are grants/facilities beneficiaries for establishment of wooden areas/orchards;	0	20
	C6 –Growth of educational services and increase the number of people involved in learning systems	IRC61 - no. of citizens completing primary, secondary and tertiary education;	2,450	2,500
		IRC62 - no. of post-secondary courses;	0	0
		IRC63 - no. of projects from European funds dedicated to school;	2	2
		IRC64 - no. of resident teachers;	10	20
		IRC65 - school drop-out rate;	1%	0
	C7 –Development of local transportation in connection with Timisoara municipality	IRC71 - no. of bus stations;	3	3
		IRC72 - no. of passengers;	200	500
		IRC73 - no. of trips to/from Timisoara;	6	10
	C8 – Development of local infrastructure	IRC81 - length of drinking water distribution network [km];	25	35
		IRC82 - length of rain water drainage network [km];	20	25
		IRC83 - no. of utilities connected houses;	720	900
		IRC84 - length of public roads [km];	70	70
		IRC85 - no. of new or reconstructed housing units;	250	500
		IRC86 - no. of specialists that are beneficiaries of housing units;	0	10
	C9 – Urbanization of commune in a healthy environment	IRC91 - volume of sorted waste per year [tone];	69	90
		IRC92 - air pollution level;	0	0
	C10 – Development of cultural offers.	IRC101 - no. of identified cultural objectives;	3	5
		IRC102 - no. of existing choral and other artistic assemblies;	4	5
		IRC103 - no. of deposed financing projects;	15	15
		IRC104 - no. of cultural projects;	5	5
		IRC105 - no. of cultural activities;	27	27
***Financial* Perspective**	**F1** - Obtaining financial resources	IRF11 - volume of external financial resources [M Euro];	2	21
		IRF12 - no. of grants;	5	7
		IRF13 - no. of attracted investment;	2	3
	F2 – Effective financing of objectives	IRF21 - commune's level of indebtedness [M Euro];	0	10
		IRF22 - budgetary reserve [M Euro];	4	1
		IRF23 - level of collection of budgetary debts [%];	75	100
***Internal Processes* Perspective**	**I1** - Preparation and implementation of investments	IRI11 – no. of created business incubators;	0	0
		IRI12 - usability;	0	0
		IRI13 - no. of new created investment;	3	5
		IRI14 - value of new created investment [M Euro];	30	100
		IRI15 - coverage of investments;	50	60
	I2 – Support for clubs and associations	IRI21 - no. of new created clubs and associations;	2	5
		IRI22 - percentage of allocated budget for associations;	0.10%	0.50%

		IRI23 - no. of participants;	50	100
		IRI24 - share allocated from the local budget;	0	0.10%
	I3 –Improvement the quality management of the local authority and public services	IRI31 - no. of annual audiences;	200	200
		IRI32 - no. of annual internal audits;	3	3
		IRI33 - no. of solved complaints;	22	22
		IRI34 - no. of new offered facilities;	2	2
	I4 –Updating the Inner Management and Control system	IRI41 - no. of procedures in use;	92	92
		IRI42 - degree of the Strategic Plan upgrading;	90%	100%
***Learning and Growth* Perspective**	**L1** –Increasing inter commune co-operation in Metropolitan Zone	IL11 - no. of projects elaborated in partnership with neighboring communes;	5	7
		ILI12 - no. of mentions in mass-media;	3	5
	L2 –Support of innovations and new IT technologies utilization	ILI21 - no. of new methods and technologies used in public administration;	2	5
		ILI22 - no. of specific IT applications in use;	8	10
		ILI23 - no. of installed IT applications;	14	18
	L3 –Development of public servants' skills and knowledge	ILI31 - no. of refresher trainings;	39	42
		ILI32 – no. of certifications granted;	39	42

The main advantages of the Excel platform for BSC model application are:

- Less time for application's development;
- Low costs or non-existent licensing fees;
- An established, knowledgeable user data base;
- An easy accessible user training;
- Good extensibility that allows easy up-grading with additional features or items in the strategic performance management of the commune.

Regarding the scalability and data integrity aspects, the solution might be using Excel as the analysis and presentation tool and storing all data in a relational database or an On-Line Analytical Processing (OLAP) cube, then linking in the Excel scorecards or dashboards (Niven, 2003).

The use of BSC allows a continuous monitoring and performance evaluation during the Strategic Plan's execution. It permits to the identification of the efficiency level in city hall's internal processes management. BSC helps to the declared mission's identification in all the four perspectives, the actions that must be done – including the KPIs – to accomplish the implementation. Because the public services, compared with the private companies, needs a high degree of consensus between the local authority and the citizens, some strategy objectives with the actions aligning is absolute necessary.

Final Discussion and Conclusions

By summarizing, it is possible to identify the following main results from our study. First, using the BSC model a strategic performance management mechanism was developed for the case of a commune (local public administration organization in Romania), allowing to report on the basis of strategic measures that were formulated. On the reference of the planned targets, expressed through measures, the local government administrators highlighted the results concerning the strategic objectives. Then the local councilors, including the mayor, were able to take correct decisions. The second finding is that the dashboard may be incorporated in an integrated information system at the County Council level.

Finally, the presented case study is considered a pilot one, which may be extended to others local administration organizations in Romania.

In conclusion to the presented approach for the strategic performance management, the following main results and findings can be formulated:

1. By using the BSC model a valid and mature strategic performance management approach was developed, thus allowing to report on the basis of strategic measures. On the basis of the planned targets, expressed through measures, the local government administrators highlighted the results concerning the strategic objectives. Then the local councilors, including the mayor, were able to take correct decisions based on a scientific approach.

2. The dashboard (BSC) may be incorporated in an integrated IT system at the county council level.

The use case has validated the correctness of the proposed approach and it can be applied and exploited to other public administrative units or bodies in Romania.

The presented research contributions could be summarized as following:

a. From the theoretical point of view

The presented approach stressed the fact that BSC is a framework expressing an organization's strategy as a set of measurable goals from different perspectives. It is shown that classic financial measurement made post-factum, if these are accompanied by the operational measurements made during the strategy implementation, can improve and growth the performances. While literature offers numerous studies about theory as well as application of BSC in profit oriented organizations, still little attention has been paid to BSC application in the public administrative ones. For this reason and in this context, in order to identify KPIs (lead indicators and lag indicators) it was mandatory to develop questionnaires that were analyzed and discussed with an appropriate panel of experts in accordance with Delphi method. As a result, it was obtained an exhaustive and accepted list of KPIs.

b. From the practical point of view

The implementation of the BSC model was a difficult process due to the fact that the majority of the people involved in this process have no knowledge in the field. One of the main benefits highlighted by this study refers to the fact that the implementation team's cohesion leads to a better understanding of the true nature of this experiment (the use case associated with the tested and validation process of the proposed approach). The practical exploitation of the proposed method and tool has supported the idea that BSC is a performance measurement system, but also as a strategic measurement system.

As concerning the information application developed on a Microsoft platform, using Excel software from Microsoft Office, it functions acceptable for small-sized administrative structures, but become inefficient larger structure. The acquisition of a professional information systems can be expansive but after their utilization the ratio cost vs. benefit is favorable to the user. Consequently, for larger local administrations (as municipalities, county councils) such alternative is recommended.

Finally, there have considered that the implementation of such performance analysis systems but in the same time, strategic managements systems, should be a main priority for the modernization process of the Romanian public administration.

References

Atkinson, A. A., and J. Q. McCrindell
1997
"Strategic performance measurement in government." CMA Magazine, April, 20–23.
Bigliardi, B., A. I. Dormio and F. Galati
2011
"Balanced Scorecard for the Public Administration: Issues from a Case Study." International Journal of Business, Management and Social Sciences, 2(5): 1-16.
Coifan, V. and A. Nica.
2017
"Strategic management of a Public Administration Unit Using Balanced Scorecard Method", Scientific Bulleting of the Politehnica University of Timisoara, Romania – Transaction on Engineering and Management, 3(1): 41-52.
Dimitrova, A. L.
2015
"The Effectiveness and Limitations of Political Integration in Central and Eastern European Member States: Lessons from Bulgaria and Romania." MAXCAP Working Paper Series.
Dinu, D. and V. Giosan
2015
'How to Improve Governance Efficiency in Romania." http://www.crpe.ro/en/wp-content/uploads/2015/03/How-to-ImproveGovernance-Efficiency-in-Romania.pdf

Fitzgerald, L., R. Johnston, T. J. Brignall, R. Sivestro, and C. Voss
1991
"Performance Measurement in Service Businesses." London, CIMA.
Heinrich, C. J.
2002
"Outcomes–based performance management in the public sector: implications for government accountability and effectiveness." Public administration review, 62(6): 712-725.
Hinţea, C. E., M. C. Profiroiu, and T. C. Ţiclău
2015
"Strategic planning and public management reform: the case of Romania." Transylvanian Review of Administrative Sciences, 11(SI): 30-44.
Hudrea, A. and C. Tripon
2016
"Organizational Culture of the Public Sector. A Study of Romanian Public Organizations." Revista de Cercetare si Interventie Sociala, (53).
Junjan, V.
2015
"Strategic Planning in Local Governments in Europe: 'Where Do We Go Now?'' Transylvanian Review of Administrative Sciences, Special Issue "Strategic Planning in Local Communities": 45-54.
Kaplan R. S. and D. P. Norton
1992
"The Balanced Scorecard: Measures that Drive Performance." Harvard Business Review, Jan–Feb: 71–79.
1996
"Using the Balanced Scorecard as a Strategic Management System." Harvard Business Review, Jan–Feb: 75–85.
2001
"Transforming the balanced scorecard from performance measurement to strategic management: Part I." Accounting horizons, 15(1): 87-104.
Kloot, L., and J. Martin
2000
"Strategic performance management: A balanced approach to performance management issues in local government. Management Accounting Research, 11(2), 231-251.
Nemec, J., and M. S. de Vries
2012
"Public sector dynamics in Central and Eastern Europe." Bratislava: Nispacee Publishers.
Niven, P. R.
2003
"Balanced Scorecard step by step for Government and Nonprofit Agencies." John Wiley & Sons.
Sorin, D. A. N.
2015
"The New Public Managementis Not That Bad After All: Evidence From Estonia, Hungary and Romania." Transylvanian Review of Administrative Sciences, 11(44): 57-73.
Văduva, S.
2016
"From Corruption to Modernity: The Evolution of Romania's Entrepreneurship Culture." Springer.
Van der Wal, Z.
2015
"All quiet on the non-Western front? A review of public service motivation scholarship in non-Western contexts." Asia Pacific Journal of Public Administration, 37(2): 69-86.
Verbeeten, F. H.
2008
"Performance management practices in public sector organizations: Impact on performance." Accounting, Auditing & Accountability Journal, 21(3): 427-454.
Wisniewski, M. and S. Olafsson
2004
"Developing Balanced Scorecards in Local Authorities: a Comparison of Experience." International Journal of Productivity and Performance Management, 53(3): 222-233.

DEFINING THE VOICE OF CUSTOMER THROUGH GEMBA

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Abstract

Purpose *– The purpose of this work is to describe an attempt to discover the customer needs using Gemba. The information obtained was used for defining the voice of customer for a future quality function deployment analysis*

Methodology/approach *– Voice of Customer and a Gemba study were used as methodology. It allows to the enterprise to identify correctly the stated and unstated client requirements. The information is transformed into the quality features for the products and processes.*

Findings *– A scientific documentation for the decision making process was obtained. The planning of products and services became a custom driven process.*

Research limitations/implications *– The Voice of Customer represents a better approach in comparison with the empirical customer analysis done before in the company. This study is just a market pretesting test. The client database has to be enriched with the new attracted customers.*

Practical implications *– The scope of the research is to help the company to increase the number of retained customers and to deliver more products and services according with the market requirements.*

Originality/value *– This work has value for the company because many of its customers did not return for a second order and preferred other furniture producers. The study provides a scientific approach for defining the Voice of Customer. This work has value also for companies which want to increase their competitiveness.*

Key words: *customer requirements, Gemba, Voice of Customer,*

Introduction

Nowadays the customers have many choices for selecting the products and services. The producers as well as the providers are located all over the world. The success of a business depends on how good the company is able to understand what really want the customer. More and more companies use modern tools in order to predict better the market changes and to anticipate the customer needs. The future market segments must be mapped, the future customer needs must be ranked and formulate new value propositions for them.

The increase of added value for the customer is a central idea in lean manufacturing. It is very important to focus on the internal and external customers and to discover what the real value is for each of them. To be customer focus means to be in charge with value stream mapping, concurrent engineering, cellular manufacturing, standardisation of parts, and use of small multiple machines. The first three elements are associated with the top management level and the last two with the manufacturing.

Lean manufacturing is a methodology to achieve competitiveness through waste decrease. Non-value added elements must be identify and eliminate from the processes. Competitive advantage can be gain by an organization by elimination of waste in each stage of the processes. Womak and Jones (1990) proposed five principles for lean manufacturing: identify what means value, value stream

mapping, eliminate the waste and create the new flow, establish pull and decline the time for clients, make lean a real part of the organization culture.

Defining gemba

GEMBA is a Japanese concept used in the process of continuous improvement. The main goal is to achieve productivity improvement. The Gemba Kaizen method has objectives and principals which can be applied in any type of organizations. These are:

- Total quality management TQM: reduces and eliminates waste
- Just in time JIT
- Total productive maintenance: production standardization for avoiding special processes
- Zero defects: prevents errors and adapts the quality to the client requirements. (Vliet, 2012)

The word Gemba direct meaning is the place where the addition of value is done or the work is done. It is associated with the real place where real things happen and where realistic plans are made. Its goal is the gain awareness about how is done the work in each stage of the processes. The meaning of the expression “go to Gemba” means to go and see what is really happening. Going to Gemba means to go and visit the customers at their locations and have interviews with them.

Real facts and data are observed in the real place. Many processes are automated and computer control. It is much easy to collect a lot of data in this way but just monitoring data one does not use Gemba for his business. To go physically in the place where the work is done means real Gemba. It is necessary to develop relationships with all the involved parts. A Gemba walk need to be completed in the production floor. This help to understand what kind of tasks are done, by whom, where, when and why.

Voice of customer

The Voice of Customer VOC concept was introduced by Griffin and Hauser in 1993. It was defined as a detailed understanding of the customers’ requirements. It is very useful for the persons involved in the product development process and in product design. This research strategy provides a framework for making high quality business development decisions.

The Voice of Customer VOC is a process used in order to obtain the proper feedback from the internal and external customers. This is done with the goal of providing a better quality for the delivered products. Voice of customer defines the specified and unspecified needs of a customer. There are different manners to do this: discussions with the clients, interviews, surveys, observations, customer complains, customer specifications. They can classified as direct, indirect and inferred methods. Direct methods are direct phone calls, sms surveys, market research. Indirect methods are forums, website reviews, social networking. Inferred methods are purchase history, transactional data and web click stream data.

The company must monitor:

- customer perceptions by communication and survey programs
- customer experience by contract and customer contract analysis
- customer issues by complaints and gap analysis.

The usage of VOC helps the company to increase customer retention and improve customer satisfaction and loyalty. The literature review mentions different figures regarding the cost of attracting a new customer in comparison with retaining an existing one. The figures vary from five to twenty five according with the industry. The marketing metrics show that the probability to sell to a new prospect is 5-20% but the probability of selling to an existing one is 60 – 70%. The advantages of using Voice of Customer method are:

- increases satisfaction expressed by net promotor score NPS with 61,2%; the net promoter score shows customer loyalty and is obtained by asking the clients how likely are to recommend the company / product to their friends on a scale from 0 to 10. NPS is calculated

by subtracting the percentage of detractors (Score 0 to 6) from the percentage of promoters (score 9 and 10).

- Increased retention 37,8%;
- Increased positive word of mouth 33%;
- Increased spend 20%;
- Decreased cost to serve 17%. (MacDonald, 2018).

Methodology

A qualitative research was done in order to identify the customers' needs. Going to the Gemba was used in order to discover the voice of customer. This was done by meeting and having discussions with the customers in the environment where they use the products as Gemba requires.

The method was applied for a furniture company which provide small furniture for individual customers but also for the offices. The selection of visited customers was done using the company database with clients for the last 3 years for the interval 2015-2017. In the first step, the customers who had orders above a specific value were selected. The selected value was calculated by adding the multiple order values for individual customers. In the second stage, the selection was done applying a step of 10 units. The recommended number of clients for this type of study is between 10 and 30 persons. More customers were selected first having in mind that many of them will reject the participation in the study. Not all the selected customers accepted to participate. The final list had 14 customers and was provided by the company manager together with the contact details.

Case Study

The study was done for a small furniture producer located in the north-west side of Romania. Due to the confidentiality aspects neither the name of the firm nor the names and addresses of its customers are not revealed. The team for the "going to the Gemba" was comprised by two persons from the company and the researcher. This was the first attempt of the company for defining the voice of customers.

The above mentioned 14 customers were interviewed in a one-to-one setting for about 30 minutes each of them. The goal of this meeting is to understand the customer experience. It is not a good idea to ask directly which the customer's needs are because very often it is difficult for him the clear express the needs. It is easy to discover them analyzing his complains.

If a company makes this type of study for more market segments, the segments are drawn according with the benefits that customer expect to derive from the products. The customer segments are analyzed by the question: "if this segment is addressed, which is the degree in which the company expect to achieve the objectives?" The question is asked for all segments and for each objective in turn. Are selected the segments which support best the weighted objective. A correlation matrix must be done.

The first step was to present the product specifications. The products were furniture for the office and for the kitchen. Both types of products are designed for offices and for homes. Some of the specifications are: adjustable height (obtained using modularity), electronic destination space, comfortable seating system, ergonomic tables, and spacious racks.

The rate of the characteristics is done on a scale from 1 to 5, where 1 is the worst level of satisfaction and 5 is the best level. The results of the discussion with each customer was collected on a "customer card". An example of customer answer is presented below:

Customer "i"

Name: XXX YYY

User: direct and daily user

Satisfaction: Average

Less facilities due to the high price

High maintenance

Ergonomic seats

Not comfortable working environment

Acceptable space for racks

Need for mobile chargers point

Poor leg room for tall people

All the fourteen customer cards were analyzed. The final step consisted of the parallel between the customer voice and the technical voice.

CUSTOMER VOICE	TECHNICAL VOICE
Need for mobile/tablets chargers	Additional electrical plugs
Poor leg room for tall persons	Redesign the layout for seats
Not enough facilities	Redesign and adding facilities
High maintenance	Implementation of more friendly products
Need for personal racks	Redesign of new smaller modules

Voice of Customer provided some important information for the company. Some of the findings helped the manager to design a better approach of the two segments which were analyzed. The results can be improved if the Customer Experience is included in relation with the Voice of Customer.

Conclusions

The analysis of the Voice of Customer took longer than was expected. This fact can be explained by the lack of experience in the field of the persons who made the visit. First four visits were done by a person from the company and the researcher but the others just by the person from the company. The analysis of the information from Voice of Customer was more difficult than was believed at the beginning.

The company considered that was obtained valuable information. It intends to refine the customer segments with more criteria and a better approach. The team must gradually improve its technique in “going to the Gemba”.

References

Antony, J. et all
2004
Using six Sigma, IEE Manufacturing Engineer, February/ March.
Griffin, A., Hauser J.R.
1993
The Voice of Customer, MIT Marketing Science Paper
Imai, M.
Gemba Kaizen: A Common sense Approach to a Continuous Improvement Strategy. McGraw-Hill.
MacDonald, S.
2018
Voice of Customer: How to 10x Your Business with VOC Data
https://www.superoffice.com/blog/voice-of-customer/
Suárez-Barraza, M.F., Ramis-Pujol, M., Estrada-Robles, M.
2012
Applying Gemba-Kaizen in a multinational food company: a process innovation frame-work. International Journal of Quality and Service Sciences, Vol. 4 Iss: 1, pp.27 – 50.
Vliet, V.
2012
Gemba Kaizen. Retrieved from ToolsHero: https://www.toolshero.com/quality-management/gemba-kaizen/
Womack, J. P., Jones, D. T., Roos D.
1990
The Machine that Changes the World, Free Press, ISBN 978-0-7432-9979-4

DMAIC IMPORTANCE AND EFFECTIVENESS IN CONTINUOUS IMPROVEMENT MINDSET

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Abstract

Purpose *– The purpose of the paper is to present the results of using DMAIC structure in process standardization on global level. Based on the achievements, a new implementation framework will be suggested to attain optimized results by relying on the chosen core tools.*

Methodology/approach *– Relevant case studies of global industries implementing DMAIC methodology were aproached. A meta-analysis from important fields has been performed and will serve as basics for elaborating a newly proposed implementation structure.*

Findings *– The use of different Lean Six Sigma tools and DMAIC structure guided to positive results in each of the 5 different industry types and studied cases.*

Research limitations/implications *–The small number of case studies from the present paper represent the research limitations. The proposed implementation structure may be used and adapted to specific areas.*

Practical implications *– By realizing a meta-analysis based on the available research, gathering the leading tools used for the attained results in the studied industries and describing them in a single source represent the practical implications of this study.*

Originality/value *– The proposal of a new implementation structure for continuous improvement described in the present paper will open further paths of development in the studied area.*

Key words: *DMAIC, Lean Manufacturing, Industry*

Introduction

A business is maintained by the goal of achieving certain milestones, both on financial and personal level. Development may be brought in many ways, one of them being continuous improvement based on a Japanese management style, focusing on standardization and preventive measures to reduce future defects as a core element. The Define Measure Analyze Improve Control, DMAIC, is the core structure of a Lean Six Sigma continuous improvement mindset.

The scope of the present paper is to synthesize results from the major industries that have used the Define Measure Analyze Improve Control methodology to achieve improved workflow and results. A second objective of the ongoing work is to suggest an optimal way of implementing DMAIC methods within a company in order to obtain results that are visible in terms of efficiency and financially reflected in the company budget.

Basics

Define Measure Analyze Improve Control is directly involved in improvement and, implicitly, in the future processes it forms. The DMAIC framework consolidates the implemented changes to improve the business flow and carries them out in a structured manner, with control steps and deadlines for each major phase. The methodology ensures a fair and efficient way of executing processes by

providing a structured way to solve the problems encountered mainly in industrial affairs (Jirasukprasert et al, 2014; Kumaravadivel and Natarajan, 2013).

The basic structure of Six Sigma is DMAIC, with the standard methodology being in the literature with applicability in many areas. In addition to adapting to their own field of standard workflow, there are companies that have had to radically change some principles in order to be able to implement the improvement (Sahno, Shevtshenko and Zahharov, 2015; Yu and Zaheer, 2010). Defining the improvement process that has to be pursued is the key element, also called scope, towards building a whole process to achieve it. The desired goal must meet the requirements of a SMART scope and has to be specific, measurable, attainable, realistic, and time-based (Awadhesh and Narottam, 2012; Vengudupathi and Rajenthira, 2015). Defining the process by setting objectives and meeting SMART criterias is probably the most important phase in the DMAIC process in order to set a correct path for improvement.

For analysis and measurement phase, process experts are needed to enable data collection and validation. Analyzing the results obtained by measurement will reveal the baseline and the main areas of process deficiency. Root causes are identified based on the obtained results (Gibbons, 2012). Improving business processes is the quintessence of the entire DMAIC process. In the improvement phase, it is possible to achieve the objectives originally defined, based on the data collection and analysis, respectively the submission of improvements for solving the underlying causes. Decisions taken without prior consideration of historical data, i.e. proposal of new methods to perform a particular process, have to be decreased to minimum. Erwin and Garman (2010) highlight the considerable element of cognitive resistance of employees to change within the organization and recommend ways to improve it in order to maximize the obtained improvements.

Control is the last and perhaps the most neglected stage of the DMAIC methodology. Control refers to supporting improved results by establishing and describing the new way of operating a process by changing past procedures. According to Mast (2012) the control stage should also include documenting past issues and correlating with identified solutions for their future prevention. The Statistical Process Control approach described by Stapenhurst (2005) is of great relevance and the results obtained are a guiding point for identifying the main root causes of process waste. The necessity, role and importance of each step in the DMAIC methodology, namely the dificulty of reducing or combining any of them represents an essential element when implementing continuous improvement. The image of a relatively easy process could influence company management team to neglect the need of human resources needed to implement this type of improvement project. Thus, the selection of capable employees, with good technical knowledge, human interaction skills and perpetual enthusiasm is irreplaceable.

Table 1. DMAIC phase flow

Phase	**Define**	**Measure**	**Analyze**	**Improve**	**Control**
Key element	• SMART goal	• Process baseline	• Data col. plan	• Brainstorm sessions	• Control charts

DMAIC in global industries

We aim to review companies that use the DMAIC approach in order to begin a continuous improvement process. Industrial areas were studied and the use of improvement methods based on the Define Measure Analyze Improve Control structure has been identified. Within the framework of the present paper the benefits obtained are syntethized, eliminating, as a proposal, the steps that had small share to the obtained results.

In an aeronautical industry company from India a DMAIC methodology has been implemented to identify and reduce costs due to a quality deficiency of manufactured components. In the case study, the desire was to improve the main chronic fault cause of the ventilation wrench assembly. The

mission of this project was to decrease component cooling unit failures during final testing from 9% to less than 2% to achieve an annual financial benefit over the next 5 months. Eckes (2001) defines as a rule of thumb the removal of 50 percent of the issues between four and five months. For defining the main issues of the process, Prashar (2014) used project plan and SMART goals, under the umbrella of DMAIC methodology. Measurement system analysis, Ishikawa diagram, Pareto method, key process input variables, brainstorming sessions, and control diagrams where also used to improve the process performance. After a well documented project, the obtained results summarize a 91 percent cost decrease compared to the basic value and a 9 percent reduction in assembly defects removal.

The same methodology was used to improve an intermediary garment factory from the textile industry. Gupta (2013) chose continuous improvement at the aimed manufacturing line as the process is difficult and the obtaining of the finite quality product is hard to achieve. The selection of the project implementation area was chosen precisely due to the high impact of the low quality finished product. In the define phase the defects per million opportunities and sigma level where determined. Supplier input process output client categorization has been used to define the process roles. Ishikawa diagram, measurement system analysis and data collection plan were implemented to establish a clear starting point for the improvement. A key improvement tool used was the design of the experiment which allowed calculation to a certain extent of the expected results. Control charts and statistical process control tool usage helped in the control phase of the improved process. The main achievement for the textile industry case study was the long-term process standardization and manufacturing process output compensation.

A case study in the automotive industry targeted to increase the sigma level and implicitly reduce the defect rate. The DMAIC methodology has been implemented as part of the Six Sigma philosophy of continuous improvement. Through its implementation in the Indian company, DMAIC methodology succeeded in reducing the number of rejected units and improving the quality of manufactured products. For implementation, a clutch assembly line for heavy machinery was targeted, as described by Yadav and Sukhwani (2016). Process mapping was used in the analyze phase in order to describe the current state of the process. Defects per million opportunities and sigma level were determined also as part of the methodology, to be able to compare the results with the initial base line. Pareto and Ishikawa diagrams were used in the analyze phase for a better understanding of the process and its gaps. Brainstorming sessions were organized as a starting tool to generate the ideas needed in the improvement phase. By combining DMAIC framework with lean manufacturing tools, an 87 percent DPMO decrease has been obtained, along with an 1.87 sigma level increase. The process results improved significantly and stabilized in time after using continuous improvement methods.

Steel industry applied the same concepts in a particular foundry factory where arched sheets for plate-based suspension are manufactured. The initial production capacity was 2,000 tons yearly, gradually increasing to 9,000 yearly, while the range of products varied. Prior to the implementation of this improvement project in the company of about 100 employees, there have been only minimal efforts to present Japanese improvement and management methodologies. Over the past six months, the company has experienced serious difficulties with a reject of 48.33 percent of the manufactured products, translated not only by additional costs, but also by failing to deliver customer demand. In order to identify the potential causes of the increased rejection rate and eliminate the underlying cause, the plant team used the DMAIC methodology. According to Shreeranga and Jnanesh (2014) measurement system analysis was mainly used in the measure phase, while brainstorming, Ishikawa, design of experiment and gemba walks defined the DMAIC analysis phase. Process mapping and SIPOC analysis used in the improvement phase had a high input for obtaining defect per million opportunities decrease by 97 percent. A 6,900 dollars yearly saving has been estimated along with a product lead time reduction in the long term.

The case study documented by Kumar and Sosnoski (2009) was conducted in a multifunctional tool manufacturing company. Having previously experienced continuous improvement projects, the company has focused on measuring and investigating quality issues. Having the Pareto analysis available from previous projects, the problem to be solved by implementing the DMAIC methodology was nominated. In the definition phase, a quality problem was identified that aimed to the components that were loosing shape in the manufacturing processes, the Amanda type punches. Process capability analysis was used to determine the baseline and potential of the current process. Descriptive statistics have been used in the measurement phase. Process mapping and Ishikawa diagram served as the basics of the analyze phase. The improvement phase, using brainstorming sessions and statistical process control, led to a manufacturing cost decrease of the punches of

15,000 dollars per annum. 99 percent decrease in defects per million opportunities underlines the success of the continuous improvement project.

From the above examples it may be seen that the same tools were used in the various DMAIC stages. The results are positive if they are applied properly and by specialized personnel. For some of the case studies only the relevant tools and stages were mentioned in the present paper assuring a concise volume of information. In figure 1. the tools used in the case studies reported in this paper are exposed. We expressed the values as utilization percentage from the total case studies of the current paper.

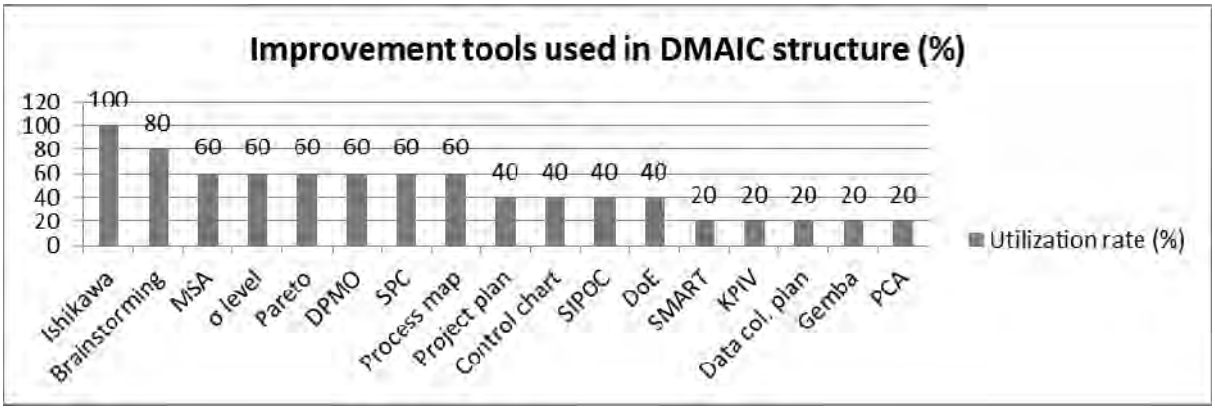

Figure 1. Improvement tools used on DMAIC structure

Key tools

The meta-analysis of the case studies helped us shape an implementation methodology using the most efficient tools deducted from the mentioned industries. In the pursuit of finding an improved implementation scheme we tried to remove the muda elements, which we considered not having an important contribution to the result of the improvement project. The frequency of lean tools usage served as a starting point for suggesting an optimal implementation methodology.

To increase the potential output of the tools we also suggested a regrouping to the optimal DMAIC phase. In table 2. we may find attached the suggested implementation methodology, based on the case studies, for achieving a more responsive and sustainable result.

Table 2. DMAIC tools and phasing

No.	DMAIC phase	Tool
1	Define	Project plan with SMART objective
2	Measure	DPMO and σ level
3		Control chart
4		Gemba
5	Analyze	Brainstorming
6		Ishikawa
7		Pareto
8		Process map
9	Improve	Brainstorming
10		Process map
11	Control	Control chart
12		SPC

The process map is useful to be applied both in the analysis and the improvement phase to define the current and desired process also. The brainstorming is also repetitive in order to obtain both current process deficiencies and future areas of improvement.

Discussion and conclusions

DMAIC is the framework of the Lean Six Sigma philosophy which structures in a useful manner the main steps to be followed for a successful implementation of Japanese management methods and principles in a bussines or enterprise. Define, Measure, Analyze, Improve, and Control set a philosophy based on continuous improvement by increasing the performance of any business type. The core structure establishment of an improvement project is the key element provided by the DMAIC methodology without which positive and sustainable results would be difficult to obtain.

Acquiring the knowledge from different industrial fields, the ones considered as having an increased relevance in achieving the final purpose of the project have been used. The main purpose of the current paper was to identify an optimal way to implement the DMAIC methodology and related tools, based on removing elements that were considered without a significant contribution to the final results. By applying the newly suggested framework in any industrial field, significant process standardization and substantial financial savings are expected.

Notes

Table 3. Acronym list

Acronym	Meaning
DMAIC	Define Measure Analyze Improve Control
DPMO	Defects Per Million Oportunities
DoE	Design of Experiment
KPIV	Key Process Input Variable
MSA	Measurement System Analysis
σ	Sigma
SMART	Specific Measurable Attainable Realistic Time-based
SPC	Statistical Process Control

References

Awadhesh, K., and S. Narottam
2012
Six Sigma DMAIC Methodology: A Powerful Tool for Improving Business Operations, Advanced Materials Research, Vol. 488-489, pg. 1147-1150
Eckes, G.
2001
The Six Sigma Revolution, How General Electric and Others Turned Process Into Profits, John Wiley & Sons Inc., New York, pg. 5-40
Erwin, D.G., and A.N. Garman
2010
Resistance to organizational change: linking research and practice, Leadership & Organization Development Journal, Vol. 31, Nr. 1, pg. 39-56
Gibbons, M. P.
2012
Introducing OEE as a measure of lean Six Sigma capability, International Journal of Lean Six Sigma, Vol. 1, Nr. 2, pg. 134 – 156
Gupta, N.
2013
An Application of DMAIC Methodology for Increasing the Yarn Quality in Textile Industry, IOSR Journal of Mechanical and Civil Engineering, Vol. 6, Nr. 1, pg. 50-65
Jirasukprasert, P., J.A. Garza-Reyes, V. Kumar, and M.K. Lim
2014
A Six Sigma and DMAIC application for the reduction of defects in a rubber gloves manufacturing process, International Journal of Lean Six Sigma, Vol. 5, Nr. 1, pg. 2-21

Kumar, S., and M. Sosnoski
2009
Using DMAIC Six Sigma to systematically improve shopfloor production quality and costs, International Journal of Productivity and Performance Management, Vol. 58, Nr. 3 pg. 254 – 273

Kumaravadivel, A., and U. Natarajan
2013
Application of Six-Sigma DMAIC methodology to sand-casting process with response surface methodology", The International Journal of Advanced Manufacturing Technology, Vol. 69, Issue: 5-8, pg. 1403-1420
Mast, J., Lokkerbol, J.
2012
An analysis of the Six Sigma DMAIC method from the perspective of problem solving, Int. J. Production Economics, Vol. 139, pg. 604–614
Prashar, A.
2014
Adoption of Six Sigma DMAIC to reduce cost of poor quality, International Journal of Productivity and Performance Management, Vol. 63 Nr. 1, pg. 103-126
Sahno, J., E. Shevtshenko, and R. Zahharov
2015
Framework for Continuous Improvement of Production Processes and Product Throughput, Procedia Engineering, Vol. 100 (2015) pg. 511 – 519
Shreeranga, E.V.G, and N.A. Jnanesh
2014
Application of Six Sigma methodology in a small-scale foundry industry, International Journal of Lean Six Sigma, Vol. 5, Nr. 2, pg. 193 – 211
Stapenhurst, T.
2005
Mastering statistical process control: a handbook for performance improvement using cases, Butterworth-Heinemann, Oxford
Vengudupathi, C., and K. Rajenthira
2016
Productivity Improvement Measures in Engineering Services Industry: An analysis using DMAIC tools, International Journal of Engineering Research Vol. 5, Nr. 4, pg. 296-298
Yadav, A., and V. K. Sukhwani
2016
Quality Improvement by using Six Sigma DMAIC in an Industry, International Journal of Current Engineering and Technology, special issue Nr. 6
Yu, J., and S. Zaheer
2010
Building a process model of local adaptation of practices: A study of Six Sigma implementation in Korean and US firms, Journal of International Business Studies, Vol. 41, pg. 475–499

NEW TRENDS IN AIRPORT MANAGEMENT

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Abstract

Purpose *– The objective of the research is to identify the new trends in airport management, taking into consideration the technological revolution and the increase of aircraft movements.*

Methodology/approach *- The study is based on a documentation regarding technologies used on airports and regulatory framework. In-situ discussions were carried at different airports and questionnaires regarding new skills and qualifications in aviation were performed.*

Findings *– Performance management that takes into account technological progress is needed and must include components such as: total airport management (TAM) and the efficiency of overall airport operations integrated in the Airport Operations Centre, which must involve innovation.*

Research limitations/implications *– Technological progress does not assure the same management trend for each airport. Different airports may not need the same digital-based investment as they do not meet the same management progress, in relation to air traffic growth.*

Practical implications *– The new approach on airport management implies changes to regulations and includes management of operations based on TAM, APOC and means of ICT, environment and societal responsibility management, connectivity, intelligence, education, training and marketing management.*

Originality/value *–The managerial directions proposed in the paper are designed to optimize management at the airport and adapt it to technological and air traffic developments.*

Key words: *airport management, digitalization, operational terminal prediction.*

Introduction

Nowadays we assist to an important technological revolution in the airport sector. From robotics in physical processing used for passenger facilitation, self-service capabilities, block-chain technologies and IOT platforms, to efficient security processes. All these evolutions have the common goal to optimize the airport operations and technology infrastructure, enhance process efficiency and improve the passenger journey through a seamless experience.

The technological development on airports involves changes in operational and terminal management but also in education and training management. In this context, the objective of the current research is to identify the new trends in airport management, taking into consideration infrastructure modifications, solutions regarding passenger flow optimization, environmental issues, or the modalities to strengthen IT management at the airport.

Also, as more and more airports apply high technologies, even having digitization department (e.g. Munich Airport), change in qualifications is needed since the aviation sector requires interdisciplinary qualifications (i.e. aviation and IT, aviation and economy, aviation and marketing, aviation and meteorology or environment). Thus, a management of competences is also required on the airport.

Operational management

Operational management must be organized taking into account a comprehensive approach such as total airport management (TAM) and the efficiency of overall airport operations integrated in the Airport Operations Centre (APOC) which must involve innovation management. New equipments for airport operations, improvements in airport infrastructure, optimisation of operations and parking position allocation, better security services and collaborative efforts towards sustainabilty are all important measures to be considered (Gittens, 2017) in a performant airport management.

APOC is the core structure for implementing total airport management which represents a holistic approach towards the optimization of airside and landside processes (AT-One, 2018). The APOC can be either a centralised physical command and control room or a distributed solution, connecting stakeholder representatives by existing and new means of supporting tools for arbitrated collaborative descision making. The APOC can be either a centralised physical command and control room or a distributed solution, connecting stakeholder representatives by existing and new means of supporting tools for arbitrated collaborative descision making. The command and control center connects stakeholders through supporting tools for collaborative decision making (AT-One, 2018).

Airport control centers of the future might improve areas such as support cognitive functions, technologies, integration and collaboration (Meier, 2012). By implementing a control center, Bucharest Henri Coandă International Airport will use prediction capabilities, automatic assistance, monitoring and alarming, thus improving operations and optimizing resources.

Fig. 1 Airport operations center facility simulation

For implementing TAM, many software were developed for optimizing operations, parking position allocation, identification of foreign obiects and birds. These equipments could chage the roules for inspections, the management of airport operations and the regulations for protected areas. The operations center uses software solutions that make real-time forecasts as new information becomes available on the day of operations, enabling the airport to take the correct decisions at the right moment in order to eliminate the impact of flights off schedule, bad weather, traffic conditions etc. (Leidos, 2018).

Terminal management

All terminal management has as main objective the passenger satisfaction. Managerial directions in the land side area aim optimizing passenger flow and reducing delays, which influence the airport performance, increasing cost efectiveness and capability to maintain satisfactory services for the customer (Adacher, 2017).

Implementing new technologies to optimize passenger flow implyes the use of new systems based on information technologies for check-in, bagage drop-off, security and border control or for bording. It is also important to facilitate the passenger experience in the terminal by using software for mobile phones in order to guide and keep the passengers informed (applying IOT), robots for helping passengers, etc. It may also be the case of autopiloted vehicles for helping passengers with reduced mobility, for which airports are obliged by the EU Regulation (EC) 1107/2006 to offer special services in order to facilitate their access to air transport. Or it may simply be the case of either elderly or young people who have never traveled, disoriented by the signs or announcements at the airport. In this case, the passengers should be assisted, since they might not to be able to get to boarding even if they arrive in time at the airport and have a valid travel ticket.

The plan for Henri Coandă Airport (HCA) regarding terminal mangement proposes a mobile application containing the plans of the airport and real-time access to traffic data. Several airports have already embraced the technology used by mobile apps for assisting passenger using indoor geolocation to guide them to their points of interest, thus redefining the passenger airport experience.

This application is a different improved version, since it uses the information of concern for each passenger, containing his flight data, this way leading him directly to relevant locations: check-in, security, border control and finnaly to the bording gate, but it can also indicate other points of interest or recommendations. Once entered in the HC airport perimeter, the passenger can start using the application by selecting his flight manually or by scanning the boarding card. Once the flight is selected, the passenger is located. The location is done by means of beacons that detect the signal emitted by the smartphone, either Wi-Fi, Bluetooth or GSM; and by triangulation the exact location will be detected.

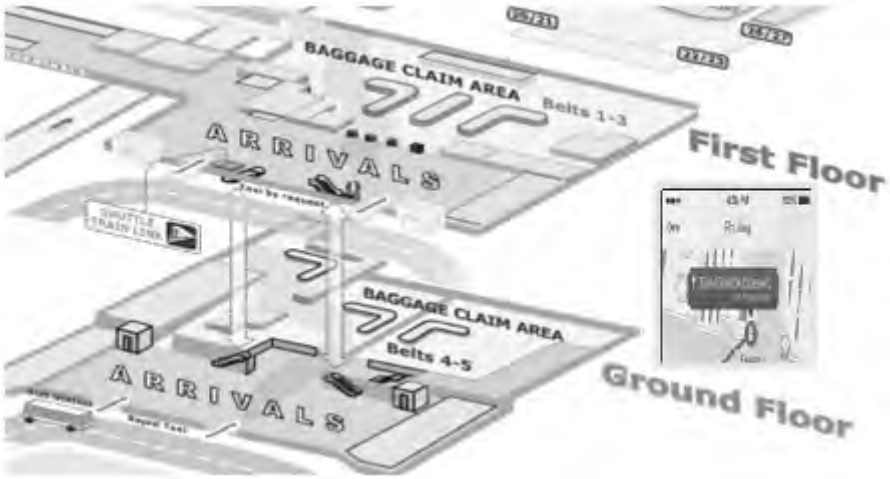

Fig. 2 Henri Coandă Airport passenger guidance facility simulation using mobile phones

For calculating the passenger's custom route in the terminal, the following data will be taken into account:

- Terminal map
- Facilities
- Flight information
- Departure time
- Bording gate

Through this app, the passenger will also receive notice on the airline's luggage policy and other relevant information, thus minimizing the time allocated for information regarding flight policy. Depending on the time available, the passenger will be guided to the airport's retail area, so the route can be customized by choosing to visit shops or restaurants. This way, the management can access the passenger position in real time and can make decisions in terms of staff management in order to

minimize waiting times for passengers, guiding them through less crowded areas. Within the APOC there is also a group for security supervision in the terminals.

The proposed management directions for Henri Coandă Airport could easily be the standard in the field in the coming years. Future passenger flow management solutions must include highly accurate measurement technologies capable to analyze airport capacity (Leidos, 2018). All new activities lead to other organisatoric structures, jobs and competences needed for the employees.

Management of intermodal connections and transport

Aviation creates prerequisite to the mobility of people by developing significant urban infrastructure and contributing to the connectivity of populations through integrated transport links (Gittens, 2017). An inter-modal approach stimulates job creation, business development and cultural activities while favoring a efficient use of existing transport capacities and facilities and ensuring connectivity among major urban centres, remote other destinations served by air (ICAO, 2014).

The authors' study also outlines the need to develop intermodal transport. Creating a special department at HC airport is needed in order to ensure better intermodality transport and furthermore, a better conexion of the airport. The result is the link of the airport by train, buses, etc. to the nearby region, or the link by high speed trains to other adjoining regions.

In Romania, an integrated multimodal transport system must be well synchronized in order to attract visitor flows and strengthen its destination's reputation as sustainable. An effective multimodal experience for passengers must include travelling on two or more forms of transport with a single ticket, providing significant conveniences at stop-points, such as retail or parking lots (Dupeyras, 2016). Henri Coandă airport has a very low management regarding multimodal transport, offering low quality public transit services, a connection of the airport with North Railway Station or the city center only with two Express bus lines, or with train. In the last case, the transfer of the passengers between the train station Airport Shuttle Point and airport is made by special buses (BHCIA, 2018). The transportation system in Bucharest can accommodate people with reduced mobility or disabilities, although transshipment from train to bus is not the easiest option for such cases. The system also gets weak points in terms of comfort, coverage or frequency and information concerning transportation options.

Management of environment

The efforts made by HC airport, targeting a sustainable development should be mirrored by an improved department for environmental management. Operational solutions provided by means of technologies and procedures adopted by the airport and air navigation service providers result in significant savings in fuel consumption for airlines or noise and local air quality improvements for the airport (ICAO, 2014).

For example, multi-airport noise models have been developed using software compliant with the European Directive 2002/49/EC and ECAC Doc 29 methodologies (EASA, 2016). Environmental benefits would be achieved by Bucharest HCA from applying this noise exposure system which uses inputs from aircraft movement, aircraft type and time of operation. This way, noise assessment will be computed using data regarding the number of aircrafts, departures and arrivals and the certified noise levels in effective perceived noise in decibels (EPNdB) at lateral, flyover and approach certification points (EASA, 2016).

$$Noise \quad Energy = \sum_{aircraft} \cdot \left(N_{dep} \cdot 10 \frac{LAT + FO}{20} + N_{arr} \cdot 10 \frac{APP - 9}{10} \right) \tag{1}$$

Operational measures should be completed by the use of new equipments in airport infrastructure; all of this must be coordinated by international policies and according to global goals. The green alternative to HCA lighting is represented by light emitting diodes which converts more than 80% of the energy into light, so no heat is released. Compared to the fluorescent tubes (which also includes metal halide lamps at Henri Coandă airport), the LED lamps illuminate at maximum capacity.

Calculating the amount of CO_2 emissions at 600g/kWh results in a reduction in CO_2 emissions of 3,755 g for a single LED lamp used at the airport. Another important aspect in means of protecting the environment is that the lamps do not contain toxic substances.

The carbon footprint of Bucharest HCIA includes direct CO_2 emissions from its own sources or under direct control of the airport (thermal power stations, generating sets, vehicle fleet, ground-handling equipment, fire-fighting equipment), as well as indirect CO_2 emissions through purchased electricity. HCA passed two of the four levels of ACI Airport Carbon Accreditation program for which it had to demonstratethe reduction of carbon emissions for previously identified sources.

Currently, lighting assemblies at platforms at HCA are composed of fluorescent tubes with high electrical discharge into metallic vapor (metal halides) with a rated power of 1000-2000W (BHCIA, 2018). In Romania, the energy sector contributes as a major factor to the deterioration of the environment through the emission of significant amounts of carbon dioxide, carbon monoxide, sulfur dioxide, nitrogen oxides, fine particles, as well as waste water spills into the atmosphere.

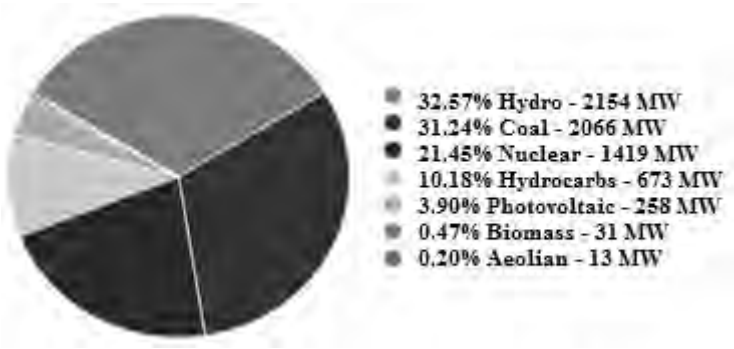

Fig. 3 Electricity production in Romania (Transelectrica, 2017)

Electricity dominates HCA consumption by over 15% of total annual costs, with the largest consumption being recorded in the terminals. In this context, reducing electricity consumption is a priority for the airport operator, which should invest in developing new technologies that are more friendly to nature. At HCA, LED technology can be used for terminal lighting, commercial areas and parking lots or in the airfield area for platform and runway lighting.

For example, Munich Airport has replaced the entire lighting system based on pressure sodium lamps (HPS) with F32 LED lighting systems. The result is a 59% reduction in energy consumption annually. In figures, this economy represents 95,760 kWh/year and 57,460 kg CO_2 /year.

Sustainable management means cost and resource efectiveness obtained by a careful planning and the use of nature-friendly technologies that provide the necessary aviation safety standards. Although for technical considerations the use of renewlable energy for aircrafts is not an option since they hinge on liquid fuels, alternative energy sources for airports such as wind and solar power are good and foreseeable options for a green airport (ICAO, 2014).

Management of ICT and HR totally changed

Emerging information and communications technologies determine the airport's transition to a passenger centric business model (Renjit, 2018). As suport for the new trends in airport management, the management of ICT and HR needs to be enhanced. Informatic systems implemented on airports already mentioned for operations and passengers need to have software platforms and to manage all these systems.

Airport transformation by means of digitization does not only imply new ICT initiatives, but involves human resource with the appropriate education and training for implementing the latest technologies, having the potential to identify changes in data application, provide solutions and widen organisation boundaries through digital development.

Air transport, as an integrating part of the world's largest industry, travel and tourism, provides $ 2.7 trillion economic benefit and employs 62.7 million people globally, predicting 99 million jobs by 2034 (Gittens, 2017).

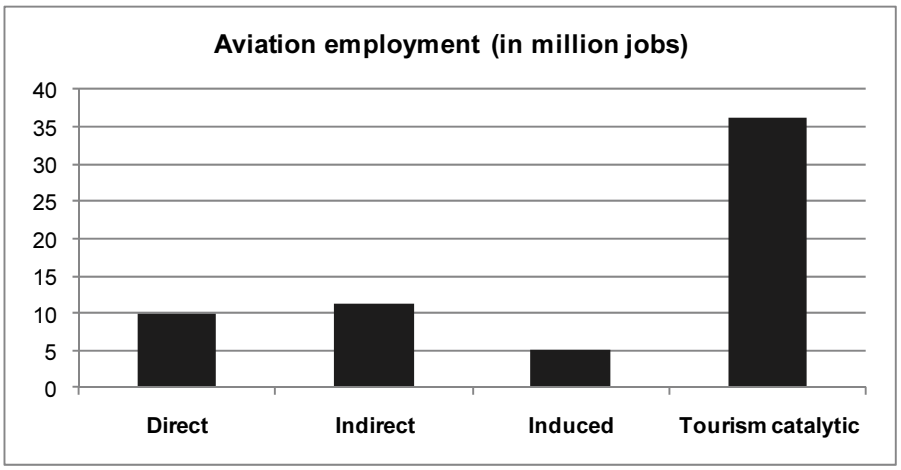

Fig. 4 Aviation employment in 2017

As the air transport sector undergoes a dynamic transformation and provides a wide diversity of regulated occupations, continuous education and specialized training for employees must be supplied, opening the door for high-level jobs based on interdisciplinary qualifications and driving long-term, sustainable economic growth (ICAO, 2014). Since the aviation industry promotes education, ICAO's Next Generation of Aviation Professionals (NGAP) program offers guarantees that qualified professionals will maintain air transport system going forward (ICAO, 2018).

It is very important to ensure the skilled persons for new jobs within the new departments. Personell with interdisciplinary skills is need, for example: ICT and aviation, economics and aviation, marketing specialists for air transport, green energy and air transport infrastructure, management for air transport or for multimodal transport. Examples of interdisciplinary qualifications can be found at the Engineering and Aeronautical Management master program at the Faculty of Aerospace Engineering, or the UNESCO Chair's Smart, Green and Integrated Transport and Logistics/ Sustainable Transport master program, both at Politehnica University in Bucharest, but also the KAAT Erasmus project which will also be completed with a master program: IT applied in aviation.

For the jobs needed in the near future in the aeronautical field, although they may have a high automation potential, competencies such as people management, complex problem solving and decision-making will be imperative (Desjardins, 2018).

Discussion and conclusions

The analyzed methodologies regarding technological improvements and the managerial directions regarding innovation capabilities proposed by the authors are meant to overtake the challenges in airport digital transformation, optimize management at the airport and adapt it to technological and air traffic developments. This way, the authors propose performing modern airport solutions which must consider having a department for environmental management and implement solutions relative to its capabilities, for limiting emissions and noise through technology.

By having control over passenger movement, airport management can handle congestions and the allocation of staff as needed, thus facilitating the use of air transport. More so, by influencing the route followed by passengers, airport revenues from non-aviation activities will also increase.

References

ACI
2018
"Reducing carbon and increasing airport sustainability" In Airport Carbon Accreditation, Airports and CO2, http://www.airportcarbonaccreditation.org/airport/

AT-One
2018
“TAM-Total Airport Management”, In ATM Research Alliance, Germany.

Adacher, L., Flamini, M., Guaita, M. and Romano, E.
2017
"A model to optimize the airport terminal departure operations" In 20th EURO Working Group on Transportation Meeting, Budapest, Hungary. Transportation Research Procedia, 27: 53-60, Elsevier.

BHCIA
2018
“Lighting assemblies at platforms at Henri Coandă Airport”, In Bucharest Henri Coandă International Airport, http://www.bucharestairports.ro/en.

Desjardins, J.
2018
"10 skills you'll need to survive the rise of automation" In World Economic Forum, Artificial Intelligence and Robotics-The skills needed to survive the robot invasion of the workplace, USA.

Dupeyras, A. and Haxton, P.
2016
“Intermodal connectivity for destinations” In OECD Centre for Entrepreneurship, SMEs and Local Development, Tourism Committee’s Programme of Work, Japan.

EASA
2016
"European Aviation Environmental Report 2016” In EASA Internal Report for European Environment Agency, European Aviation Safety Agency and Eurocontrol.

Gittens, A., Poole, J., de Juniac, A., Liu, F. and Pie, J.
2017
“Aviation Benefits”, In Airport Council International Internal Report, ACI.

ICAO
2014
"Global Aviation and Our Sustainable Future” Paper presented at the United Nations Conference on Sustainable Development, ICAO Briefing for RIO+20, Rio de Janeiro.

ICAO
2018
"Next Generation of Aviation Professionals (NGAP)” International Civil Aviation Organization Safety, https://www.icao.int/safety/ngap/Pages/default.aspx

Leidos
2018
"Improving the passenger experience with passenger flow management" In International Airport Review, Passenger flow management, Reston, Virginia.

Meier, C. and Batt, S.
2012
“Airport Control Centers of the Future” In Siemens Airport IT&T Conference, Munich.

Renjit, B.
2018
"Airports’ IT spending to top $4.6 billion by 2023" In International Airport Review, Digital Transformation in airports.

Transelectrica
2017
"Electricity production in Romania” In Transelectrica, Romania, http://www.transelectrica.ro/

METHODOLOGY FOR DESIGNING THE LAYOUT FOR AN ASSEMBLY LINE TO THE AUTOMOTIVE INDUSTRY USING THE LEAN CONCEPT

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Abstract

Purpose *– The article presents a first stage of development of methodology for designing the layout for an assembly line to the automotive industry.*

Approach *– The methodology developed includes 10 interrelated activities, which were presented in a graphical form using principles specific to IDEF0 functional modelling method and contain the main request imposed by the Lean Manufacturing concept.*

Findings *– The final result of this methodology is the layout plan of the assembly line and its set of performance indicators of the assembly line functioning. These results are validated after the step of functional modelling and simulation of production line.*

Research limitations/implications *– The methodology will be tested and validated in laboratory conditions, this allowing a higher level of TRL (Technology Readiness Level) during the research. Also, it is applicable only to the design of assembly lines specific to components from automotive industry.*

Practical implications *– This methodology allows the industrial system designer to obtain a layout plant and performance indicators of the functioning of the production line.*

Originality/value *– The study is part of a research project of the authors, which has as aim the development of a methodology of improvement of production flows in the automotive industry, by integrating modern techniques and instruments of production management.*

Key words: *layout plan, assembly line, lean manufacturing*

Introduction

Globalization of production and strong competition in the economic environment requires manufacturers to offer their customers a wide range of products, of the best quality and at lower prices. Ensuring a high productivity and a quick response to customers as well as reducing the cycle time and inventories are objectives are for most manufacturers.

In the automotive industry, one way to achieve a competitive advantage is to adapt their production systems to mass customisation, so that they can provide the variety demanded by the customers while limiting their costs and maintaining their profitability (Limere, 2012). This requires uniform production flow, increase the flexibility of the production system and its responsiveness to customer requests. To achieve these goals, it is necessary to use in the layout planning, work organization and production management the most modern methods, techniques and tools of production management, such as modelling and simulating production flows and Lean manufacturing.

Research problem

This study is part of a research project of the authors that has as aim to develop new methodologies of improvement for the production flows of automotive industry, by integrating modern methods, techniques and tools of production management. The starting conceptual model is appreciated as having Technology Readiness Level 2 - TRL2 (DOE G 413.3-4, 2009) and is presented in fig. 1.

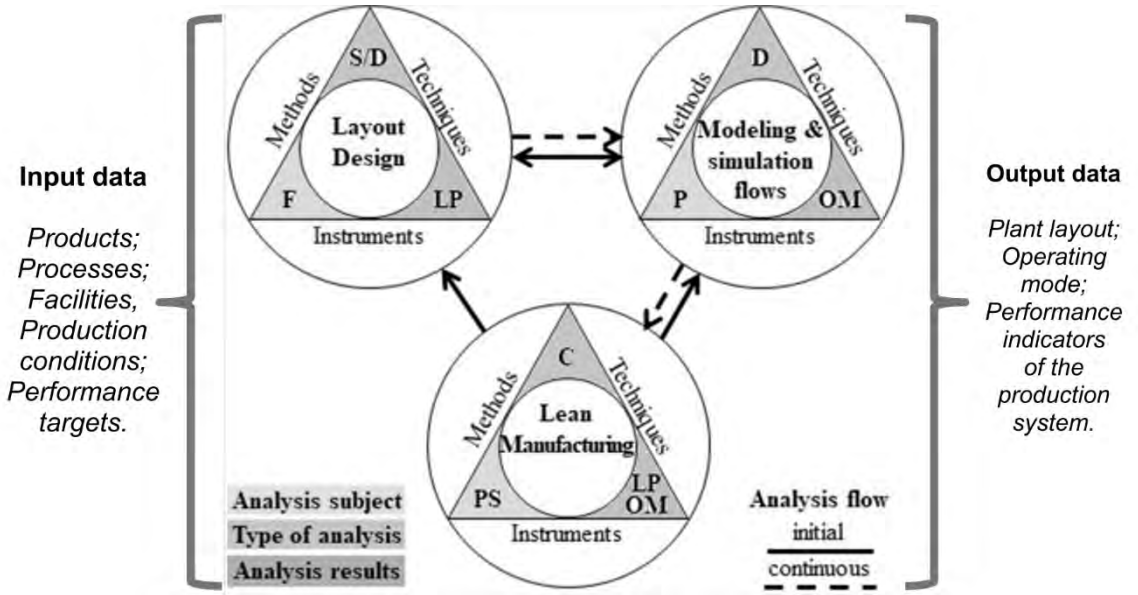

Fig.1. Conceptual model for improving production flows

The proposed model has 3 interrelated investigations areas: layout design, in which the subject of analysis are the facilities (F), and the result is the plant layout (LP); modelling and simulation flows, in which the subject of analysis is production (P), and the result is the operating mode of the system (OM); Lean manufacturing, in which the subject of analysis is the production system (SP), and the results are the improved layout plan (LP) and operating mode of the system (OM).

The starting element in this general methodology is the layout design of the production system, which can be made in a static way (S) or dynamic (D). The resulting layout plant is improved, first, by the modelling and simulation of production flows, and after – in a continuous manner (C), by using the methods and techniques specific to Lean Manufacturing.

Approach

This paper is a first stage of development of the first methodology - methodology for designing the layout for an assembly line to the automotive industry, as an integrated part of the general methodology to improve the production flows.

Facilities layout is a systematic and functional arrangement of different departments, machines, equipments and services in a manufacturing establishment (Khan, 2013) and is an important problem for modern manufacturing systems and it plays a key role for the manufacturing system design process. A well-developed plant layout, in an optimal manner, ensure the maximum out of the capacity of the facilities. An assembly line is an assembly process were the equipment and the workstations are so arranged that the sequence of assembly is followed (Blackstone, 2010).

The primary purpose of any plant layout is to facilitate the manufacturing process. Additional objectives include (Muther, 2015): minimizing material handling (especially travel distance and time), maintaining flexibility of arrangement and operation as needs change, promoting high turnover of work-in-process – keeping it moving, holding down investment in equipment, making economical use of floor space, remoting effective utilization of labor, providing for employees' safety, comfort and convenience.

The core idea of Lean manufacturing is to work permanently on eliminating waste from the manufacturing process. Lean facility layout means to arrange the physical equipment within a workshop to help the facility work in a productive way (Wilson, 2015). A good layout scheme would contribute to the overall efficiency of operations. Using the same equipment and production line for the different models of a product, and standardized work are two of the Lean principles (Ohno, 1988). The changes of production planning, technological process, production organizational mode and material handling will all affect the facility distribution scheme of a production line (Jia, 2006).

From what was presented previously results that the main requirements imposed to an assembly line from the Lean point of view are:

- To ensure a high flexibility for the workstations, so a higher diversity of products can be made with minimum of changeover;
- To design a modular structures – built into modular workstations, in order to decrease the costs of design and manufacture of the industrial system, and also to decrease the impact of reconfiguration of layout and process flexibility;
- To give the possibility to adapt the process to the clients demand – manufacture on an „one piece flow" to increase the reactivity to client demand, this needing "zero setup" for workstation;
- To minimize the activities with non-added value (mainly, movements and handlings), in order to achieve the target of "NonVA = 0".

The methodology for designing the layout for an assembly line to the automotive industry was elaborated considering the results of previous research from the literature, and also results of the groups own research (Gavriluţă, 2012) and (Gavriluţă, 2017). It contains an assembly of interconnected activities, represented in a graphic form that resembles the functional modelling method IDEF0, fig. 2:

- Activities – represented by rectangles;
- Input – represented by arrows in the left side of activities;
- Output – represented by arrows in the right side of activities;
- Control – represented by arrows in the upper side of the activities;
- Mechanisms and resources – represented by arrows in the lower side of activities.

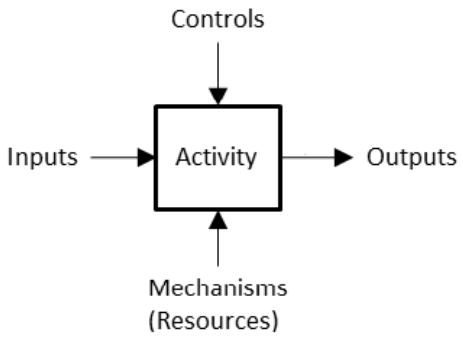

Fig. 2. Representation elements for layout design

The methodology for designing the layout for an assembly line to the automotive industry includes a number of 10 interrelated activities, shown in fig. 3. These activities are described in the followings and schematically represented in the fig. 4 to 13.

The first activity, fig. 4, consists in the *analysis of the product to be assembled.* The entry data are the product assembly drawing, characteristics of material, dimensions, mass and components and product quality. Using graphic techniques or CAD it is made the bill of materials.

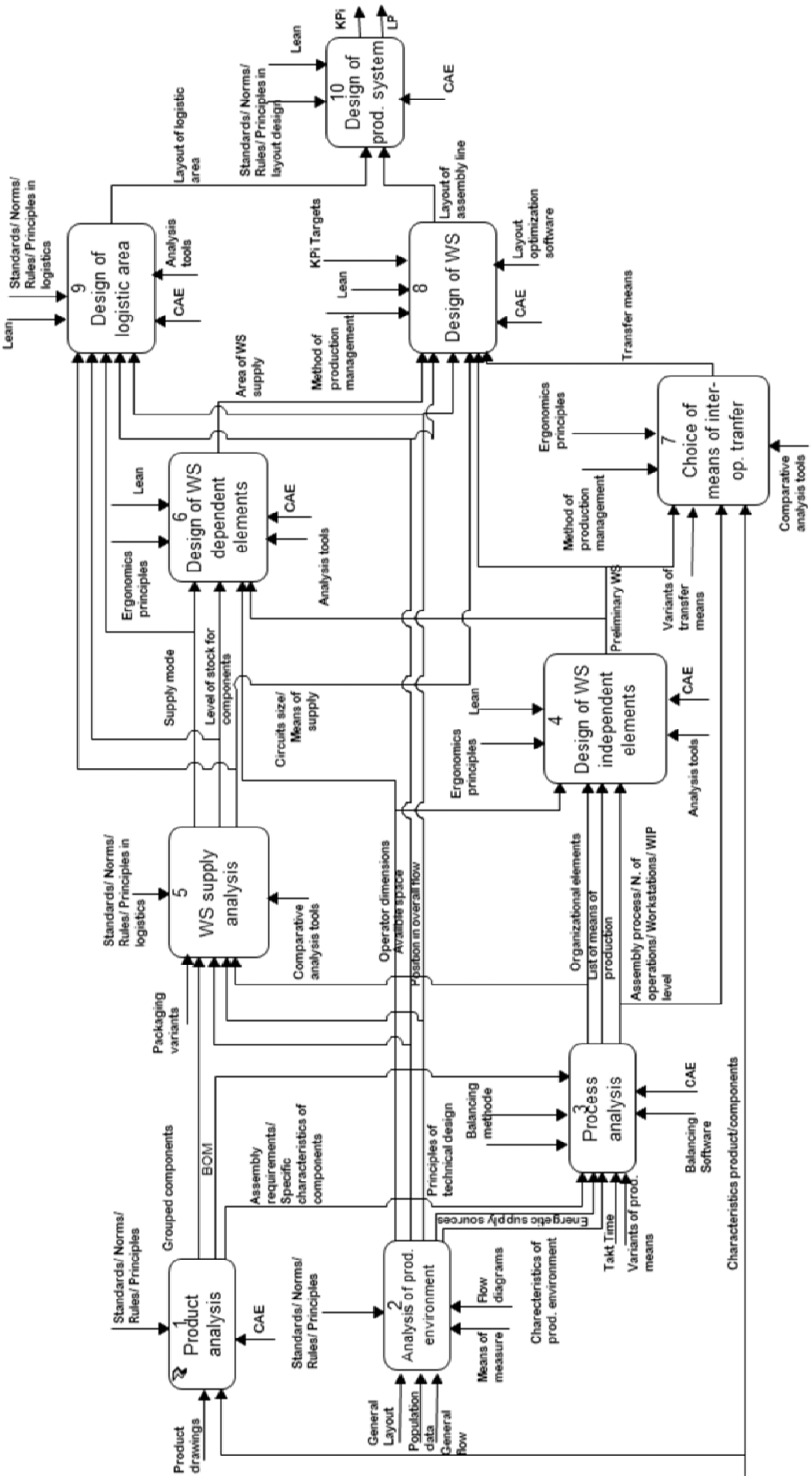

Fig. 3. Graphic representation of the methodology for designing the layout for an assembly line to the automotive industry

The product components are grouped on categories depending on characteristics of handling/ supply (mass, volume, fragility) and are highlighted the characteristics needed for the assembly process (mechanic properties of material, quality of surfaces etc.). In this analysis are used standards, norms of ergonomics (referring to handling and components supply), assembly process (referring to constraints of process) and work health – safety (components with impact on the health and safety of workers).

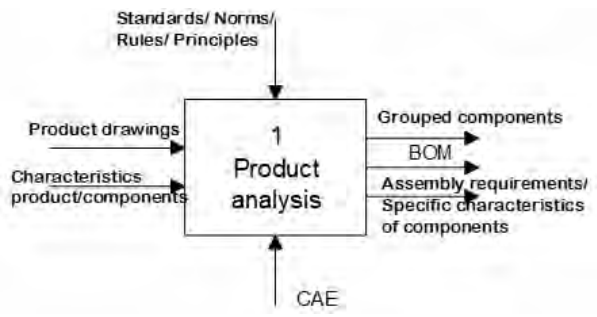

Fig. 4. Product analysis

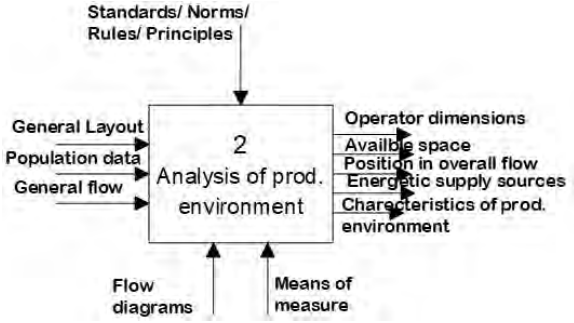

Fig. 5. Analysis of working environment

The second activity, fig. 5, consists in the *analysis of working environment.* The entry data are: the general production flow, the position of the production area inside the enterprise and the ergonomic characteristics of the local population. Using flow diagrams and other means of measurement of production environment characteristics are identified: the position of assembly process in the general production flow (links with suppliers and clients), available space (shape, dimensions, access ways etc.), the average dimensions of local population of workers, availability and characteristics of energetic supply (electricity, compressed air, water etc.) and characteristics of production environment (temperature, humidity, lighting etc.).

The analysis of assembly process, fig. 6, is *the third activity*. A part of entry data (characteristics of components specific to assembly process) are taken from the product analysis, some from the analysis of working environment (energetic supply and working environment characteristics) and others are specific to this activity: takt time and variants of production means (equipment and tools for assembly, control, marking, labeling etc.). Using CAD means and software solutions for lines balancing, starting from the BOP and the principles of design of assembly technologies are established the operations and process stages of the workstations. The means of production are chosen accordingly and also are established the organizational elements of the process (capacity of production and its accepted limits of variation, production durations, work in process, possibilities for production launching).

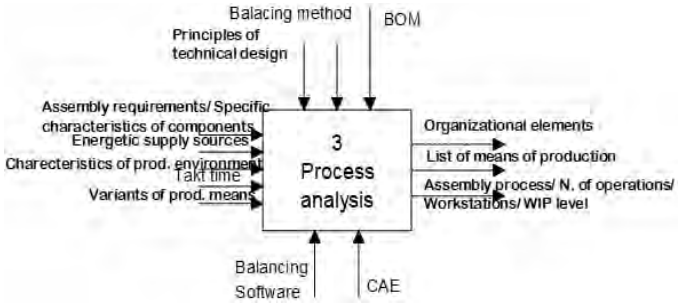

Fig. 6. Process analysis

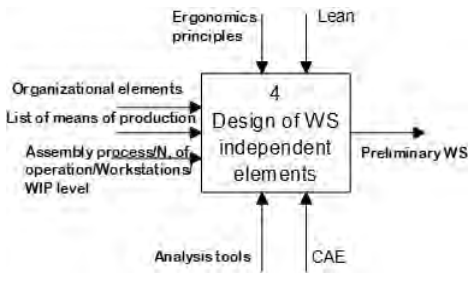

Fig. 7. Design of workstation independent elements

The forth activity, fig. 7, consists in the design of workstation independent elements of the supply method. The entry data came from the analysis of working environment and the analysis of process: average dimensions of the operator, the technologic assembly process, and the means of production and the organizational elements of the process. Using CAD means and instruments of analysis of operators flow, applying principles of ergonomics and Lean manufacturing, are designed the elements of workstation that are independent of the method of supply with components, resulting the preliminary layout of the workstation (operators working space and the position of production means).

The analysis of workstations supply, fig. 8, is the fifth activity. The entry data come from the product analysis, process analysis and from the suppliers. The data is: components grouped function of mass, volume and fragility, the position of the process in the general production flow, available space, organizational elements of the process and the characteristics of components packaging. Using the comparative analysis tools are established the modes of supply for each workstation (method of supply, packaging for each component, and for each category), the circuits and means of supply, resulting the size of stocks. In this purpose are used standards and norms specific for logistic processes.

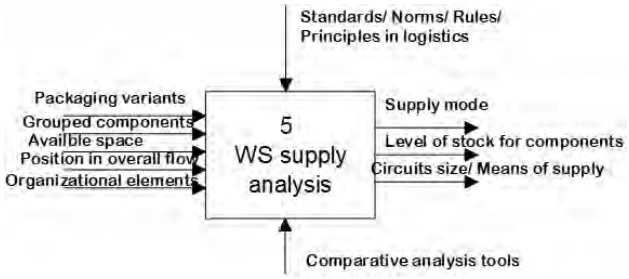

Fig. 8. Workstation supply analysis

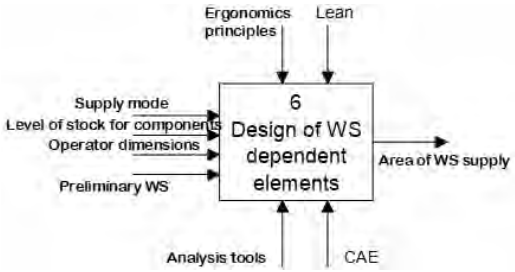

Fig. 9. Design of workstation dependent elements

The sixth activity, fig. 9, consists in *the design of workstation elements dependent of the supply method.* The entry data come from the analysis of production environment, the analysis of workstation supply and the design of independent elements of the workstation: operator average dimensions, mode of supply with components and the preliminary workstation layout. Using CAD and other means of comparative analysis, is dimensioned the area of supply for each workstation, considering ergonomics and Lean Manufacturing principles.

The choice of inter-operational means, fig. 10, is *the seventh activity*. The entry data come from previous activities: process analysis, the design of the independent elements of workstation (technologic assembly process and the stages of evolution of product, the number of workstations, WIP, the preliminary workstation layout, components materials, dimensions, mass and quality requirements), and specific data: variants of transfer means. Using comparative analysis tools are determined the optimum solutions for inter-operations transfer, considering ergonomics principles and the method of manufacturing management.

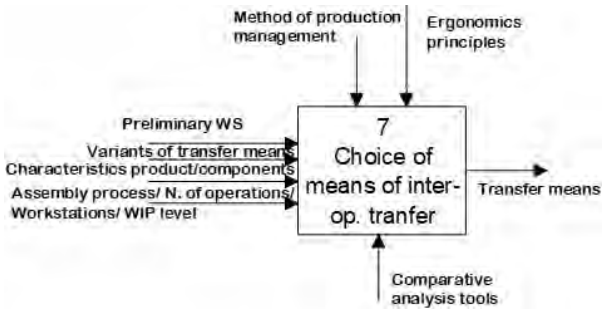

Fig. 10. Choice of interoperable transfer means

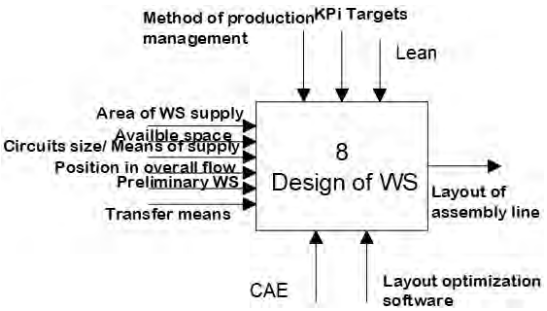

Fig. 11. Design of workstations

The eight activity, fig. 11, is the design of workstations layout. The entry data come from the previous activities: production environment analysis, the analysis of workstations supply, the design of independent and depend elements of the workstation and the choice of transfer means: the available space and the positioning in the general flow, circuits and means of supply, the preliminary workstation layouts, the supply areas, means of inter-operations transfer. Using CAD instruments and tools of special optimization, are defined the spatial organizations of workstations, considering the method of production management and the targets (limits) imposed to KPI of the production line.

The design of the logistic area, fig. 12, is the ninth activity. The entry data come from the analysis of working environment and the analysis of workstation supply: the available space, positioning in the

general flow, the mode of supply and the size of components stock. Using CAD and other comparative analysis tools is done the design of logistic area configuration, considering the standards and norms specific to logistic processes.

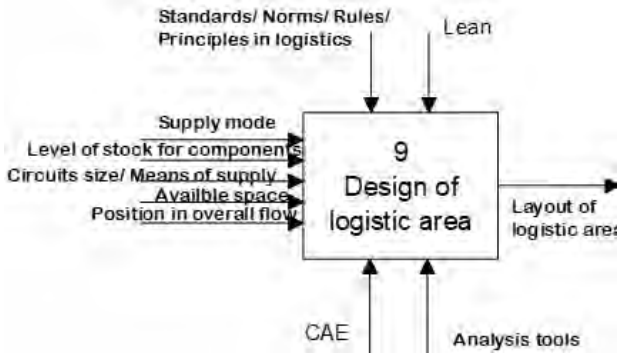

Fig. 12. Design of logistic area

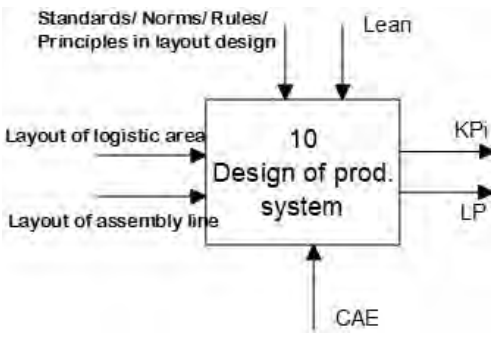

Fig. 13. Design of production system

The last activity, fig. 13, is represented by the *design of the production system*. It consists in the integration of activities 8 and 9 in the general production layout. Also there are determined the values of KPIs for the assembly line functioning. In this purpose are used CAD tools, considering standards and norms specific to production layout design (equipment positioning, dimensions of access ways etc.)

Findings

The data needed to apply this methodology are numerous and complex, coming from many fields of industrial activities: product design, technology design, industrial systems design, ergonomics and manufacturing management. Also, the controls (methods), used in these activities are very divers: from standards and norms (technical drawing, ergonomics, logistic), to rules and principles specific to the design of assembly process, work ergonomics, spatial organization of production systems, Lean Manufacturing and production management.

The techniques and tools used to make these activities are mainly from the field of computer added engineering (computer added design, technology design, production line balancing, spatial organization), but also specific to flow analysis or comparative analysis (decisional techniques).

The use of Lean Manufacturing concepts, is found in the majority of activities, mainly in the ones of design: design of workstation (independent and dependent elements, their compilation), design of logistic area and production system.

The final result (the aim of this methodology) is represented but the layout of the assembly line and a set of KPIs (performance indicators) of its functioning. The layout of the assembly line is a complex document that contains: the civil work layout, the layout of production means positioning, flow schematics, plan of pedestrian circulation, layout of connection points to the utilities etc. The KPIs of assembly line performance contain information about: surface (occupancy, capacity of production/ used surface), operator non-added value (movement, handling), functional flexibility (the possibility to vary the production capacity, the service of multiple workstations by an operator), and costs of layout implementation. The results are validated after the activity of modelling and simulation of the functionality of the production system.

Conclusions

In this paper is presented a first study on the development of the methodology for designing the layout for an assembly line to the automotive industry. This methodology allows the industrial system designer to obtain a layout and KPIs of the functioning of the production line, that consider the needs of modern production, expressed by Lean Manufacturing concepts. This methodology will be experimented and validated in laboratory conditions, these allowing to pass to a superior level of research TRL (Technology Readiness Level).

From what was previously presented results that the process of layout design of an assembly line is a complex and laborious one and has important consequences on the functioning of the production system. The obtained result by using this methodology can be improved, in a continuous manner, by applying Lean Manufacturing methods during the working life of the industrial system. This ways of improvement of the plant layout consists, with the functional modelling and simulation, the directions of further research continuation for the project from which this paper is part of.

Acknowledgments

This work was supported by a grant of the Romanian Ministry of Research and Innovation, CCCDI – UEFISCDI, project number PN-III-P1-1.2-PCCDI-2017-0446 / 82-PCCDI-2018, within PNCDI III.

References

Blackstone - Jr., J.H., Johan, J.
2010
APICS Dictionary (Thirteenth edition), APICS, Chicago, Illinois, USA
DOE G 413.3-4
2009
“Technology Readiness Assessment Guide”. Department of Energy, U.S.
https://www.directives.doe.gov/directives-documents/400-series/0413.3-EGuide-04
Gavriluţă, A., Niţu, E., and Rotaru A.
2012
“The impact of supply methods on the workstations layout design”. In Proceedings of the 3th Review of Management and Economic Engineering – International Management Conference “A new dilemma: between East and West”. 263-274
Gavriluţă, A., Gavriluţă A., Niţu, E.L., and Schutz J.
2017
“From 3D layout to dynamic simulation model”, In Proceedings of the 21st Innovative Manufacturing Engineering & Energy International Conference – IManE&E 2017, MATEC Web of Conferences, 112: 06020 (DOI: https://doi.org/10.1051/matecconf/201711206020)
Jia, Z., Lu, X., Liu, D.
2006
“The research on lean rework and balancing of the cylinder liner production line”. In Proceedings of the World Congress on Intelligent Control and Automation (WCICA). 2 6680-6684
Khan, A. J., Tidke D.J.
2013
“Designing Facilities Layout for Small and Medium Enterprises”. International Journal of Engineering Research and General Science. 1(2) 55-62
Limere, V.
2012
“Optimising part feeding in the automotive assembly industry: deciding between kitting and line stocking”. International Journal of Production Research. 50(15) 4046-4060
Muther, R., Hales, L.
2015
Systematic Layout Planning (Fourth Edition). Management & Industrial Research Publications, Marietta, GA, USA
Ohno, T.
1988
Toyota Production System, Beyond Large-Scale Production. Productivity Press Portland, Oregon, USA
Wilson, L.
2015
How to Implement Lean Manufacturing (Second Edition), McGraw-Hill Education, USA

INDUSTRY 4.0 IMPLEMENTATION MODEL: TAKING STEPS TOWARDS DIGITIZATION

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Webpage: http://www.utcluj.ro/ [1,4], http://www.upm.ro/ [2,3,5]

Abstract

Purpose *– The purpose of the paper is to develop an algorithm for Industry 4.0 implementation in a factory / company. There are many studies pointing enablers, advantages, limitations, challenges, principles, characteristics of Industry 4.0, but how do we really start implementing this complex process in a factory? This paper describes a step-by-step method by combining the Kaizen and Toyota Kata approaches with digitization process.*

Methodology/approach *– The bibliographic study method was used to get a better understanding about Industry 4.0 introduction. A literature survey was conducted among articles indexed in Web of Science and reviews of research were studied in depth with the aim to identify the most important and relevant steps to take towards digitization.*

Findings *– A model with established steps and an implementation template were developed to facilitate Industry 4.0 introduction.*

Research limitations/implications *– The model needs to be adapted to the specific of the company. A further and deeper research is required to compare the model with other existent ones.*

Practical implications *– The practical implications of the paper is given by the development of a model to implement Industry 4.0 by combining two methodological approaches: Toyota Kata and Kaizen with technology-driven approach Industry 4.0 with the goal of identifying concrete steps to take towards digitization. As well, an implementation template was developed to facilitate model application.*

Originality/value *– Toyota Kata was never before interlinked with Industry 4.0 with the aim to develop an implementation model.*

Key words: *Industrie 4.0, lean manufacturing, Toyota Kata.*

Introduction

Digitization led us to the forth industrial revolution.

Industry 4.0 is a strategic initiative recently introduced by the German government. The goal of the initiative is transformation of industrial manufacturing through digitalization and exploitation of potentials of new technologies. An Industry 4.0 production system is thus flexible and enables individualized and customized products (Rojko, 2017).

The Industry 4.0 vision is to build industrial enterprises, which connects equipment, factories and warehouse facilities as cyber-physic systems to the global network and control each other through information exchange, which can generate actions. In the center of the described vision is the Smart Factory, which will change the production process by using intelligent machines, intelligent storage systems, intelligent facilities and supply chains with the aim to increase efficiency and productivity.

The Industry 4.0 is a complex subject and internet abounds with information about it. Hundreds of books and valuable research scientific papers point and analyze in detail limitations, enablers, advantages, challenges, principles, characteristics, components and so on. As this is not the aim of our paper, we will skip this part and deep directly into the model description.

The bibliographic study was used to get a better understanding about Industry 4.0. A literature survey was conducted among articles indexed in Web of Science and reviews of research were studied in depth with the aim to identify the most important and relevant steps to take towards digitization and to sketch them into an implementation model.

I. The development premises of Industry 4.0 implementation model

A model of implementation was developed by combining two methodological approaches: Toyota Kata and PDCA cycle with technology-driven approach Industry 4.0, with the goal of identifying concrete steps to take towards digitization.

What is and why PDCA?

The PDCA cycle, also known as Deming circle, is a method used for control and continuous improvement of business processes and products.

The four step cycle for problem solving includes:

1. Planning - defining of a problem and a hypothesis about possible causes and solutions, setting the objectives;
2. Doing - implementing the plan, making the product;
3. Checking - evaluating the results, comparing them against the expected results;
4. Action of Adjusting – going back to plan if the results are unsatisfactory or standardize if the expected results are achieved (Veres, Marian and Moica, 2017).

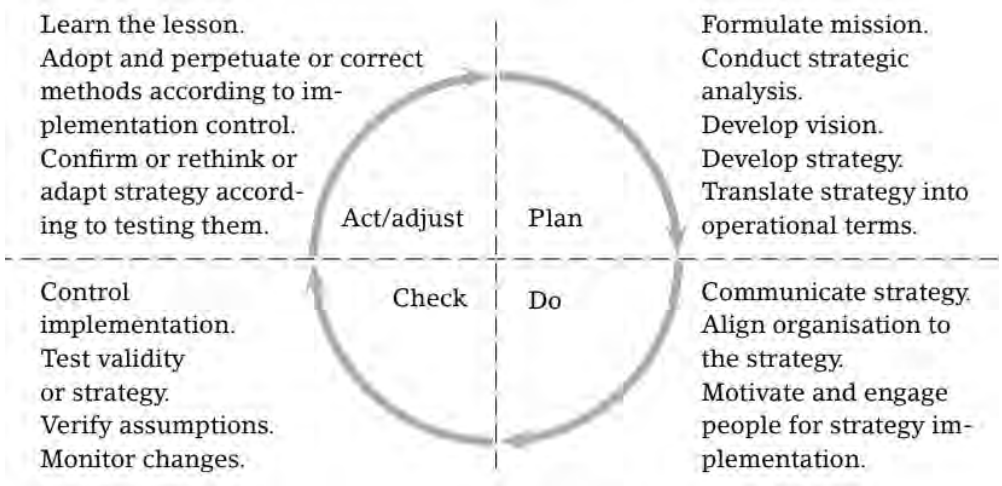


Fig. 1. Strategic Learning Process Framed on the PDCA Cycle
(Pietrzak and Paliszkiewicz, 2015)

Worldwide used PDCA scientific method proved its practical approach and as authors agree, it is very adaptable, as it's applicable in all sorts of projects and improvement activities (Rother, 2010).

World Leader Toyota and other lean manufacturing companies propose that an engaged, problem-solving workforce using PDCA in a culture of critical thinking is better able to innovate and stay ahead of the competition through rigorous problem solving and the subsequent innovations (Liker, 2004).

What is and why Toyota Kata?

Toyota Kata is a concept that teaches the scientific thinking as an ability to adapt and was introduced by Mike Rother in year 2009 in his book “Toyota Kata, Managing People for Improvement, Adaptiveness, and Superior Results”. The book’s underlying message is that when people practice and learn a kata for how to proceed through unclear territory, they don't need to fear the obstacles, changes and unknowns they encounter. Rather than trying to hold on to a sense of certainty based on one's perspective, people can derive confidence from a kata for working through uncertainty (Rother, 2009).

It involves a running comparison between what you predict will happen next, seeing what actually happens, and adjusting based on what you learn from the difference. Kata are simple, structured routines that you practice deliberately, especially at the beginning, so their pattern becomes a habit and leaves you with new abilities (Rother, 2018).

It is a holistic system method for improvement efforts, which contains processes, and behavioral patterns for strategically aligned goal setting, problem solving, coaching, management and training. The downside of the approach is its focus on incremental improvement instead of breakthrough innovation (Toivonen, 2015).

Above-mentioned characteristics makes Toyota Kata appropriate in the context of Industry 4.0.

Another important to mention aspect of Toyota Kata in Industry 4.0 context, is the Coaching Kata. The Coaching Kata is a way of teaching and coaching the improvement Kata and aligning the direction of the improvement activities to the common goals of the organization. The role of the coach and coaching kata is to help the person who is doing the Improvement Kata (learner) to stay within the Kata routine (Rother, 2014; Toivonen, 2015).

An elaborated research compared both PDCA and Kata Approaches and came to the conclusion that the first one is more complex than the second and takes the inexperienced process owner more time and effort to learn. However, it delivers a crucial competitive advantage. It prepares the organization to follow a solid path towards organizational alignment (Villalba-Diez, Ordieres-Meré and Rubio-Valdehita, 2016).

The model presented in this study combines advantages of both approaches to develop an improved path towards Industry 4.0.

II. THE TDI MODEL FOR IMPLEMENTING INDUSTRY 4.0

The TDI model (figure 2) is proposed for Industry 4.0 implementation. TDI are the initials for:

- Train – Describe – Implement, or their equivalents:
- Teach – Develop – Introduce changes.

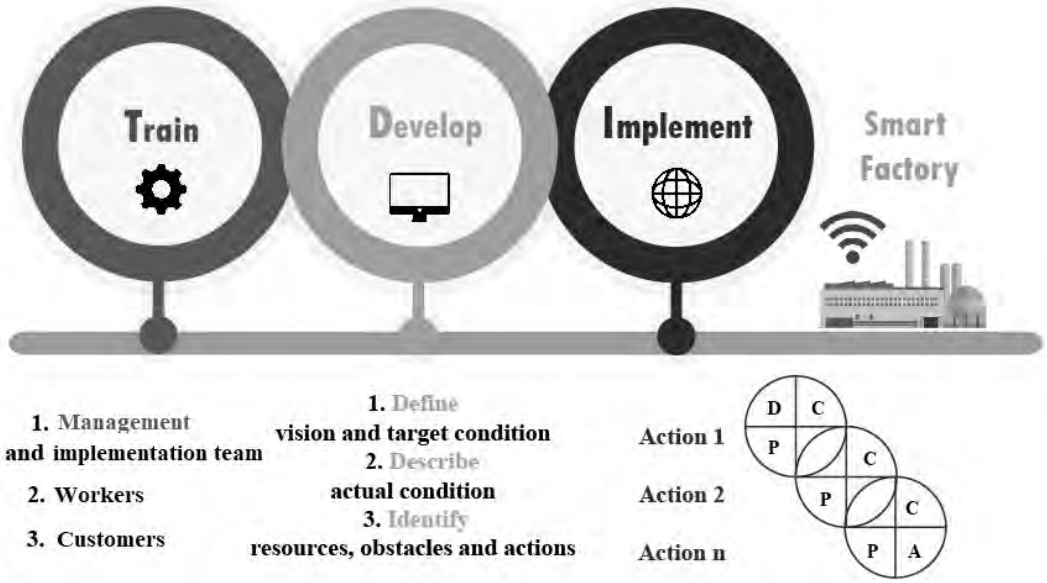


Fig. 2. TDI model for Industry 4.0 implementation

Further a more detailed description of each step will be done.

Step I : Train / Teach

Industry 4.0 is a recently introduced domain and before taking steps towards digitization, the subject should be clearly understood. Trainings and workforce specializations are needed to provide a better understanding of the subject, first for management and implementation team, then for operators and customers.

Industry 4.0 comes with its specific terminology. More than that, it requires new skills and qualifications. A research elaborated by VDI The Association of German Engineers in 2015 made a list of required skills and qualifications of workers in future, which applies perfectly in the context of Industry 4.0, classified in “must have skills”, “should have skills” and “could have skills” (Gehrke et al., 2015; Karre et al.2017). Important advantages for future workers will be given by the ability to interact with modern interfaces, to process and analyze data and information, as well as to have organizational and processual understanding capacity (see table 1).

Table 1. Future required skills and qualifications of the workforce (Gehrke et al., 2015)

	Classification of required skills and qualifications		
	Must	**Should**	**Could**
Technical	IT knowledge and abilities	Knowledge management	Computer programming and coding abilities
	Data and information processing and analytics	Interdisciplinary/generic knowledge about technologies and organizations	Specialized knowledge about technologies
	Statistical knowledge	Awareness for IT-security and data protection	Awareness for ergonomics
	Organizational and processual understanding	Specialized knowledge of manufacturing activities and processes	Understanding of legal affairs
	Ability to interact with modern interfaces		
Personal	Self and time management	Trust in new technologies	
	Adaptability/ability to change	Continuous improvement and lifelong learning	
	Team work abilities		
	Social skills		
	Communication skills		

In Industry 4.0 implementation human factor has an important implication and cannot be ignored. Before changes are operated by machinery autonomy, changes are driven by people and should be introduced and controlled by them. Even if automation is causing the decrease of employees' number, several authors agreed: "human beings in production are not considered expendable, but are still necessary because they are better able to carry out certain processes and are better qualified to make certain decisions than cyber-physical system" (Spath et. al., 2013; Hirsch-Kreinsen, 2014; Windelband, 2014; Prinz C., Kreggenfeld N. and Kuhlenkotter B., 2018).

Nowadays Internet helps us with valuable and detailed information about Industry 4.0: scientific articles, books, statistical research, case study videos and so on. Here is a list of subjects to cover in the training process:

- History of Industry 4.0;
- Drivers, enablers and challenges;
- Basic elements of Industry 4.0;
- Internet of Things and Internet of Services;
- Smart devices and products;
- System and technology for enabling Industry 4.0;
- Cyber-physical systems and cyber security;
- Cloud computing;
- Case studies of Industry 4.0 application.

Step II: Describe / Develop

Once we already understand the Industry 4.0 concept and terminology, the second step pleads for a good preparation and involves three processes present in Toyota Kata concept, as shown in figure 3.

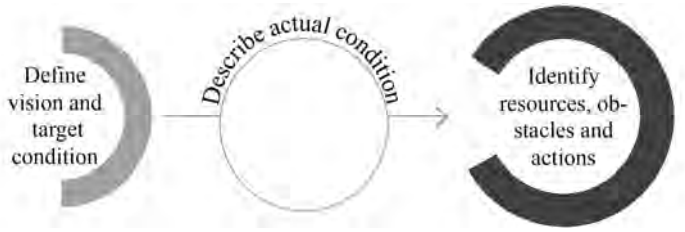


Fig. 3. Three processes in Description step

A. Create a vision and define a target condition

At this stage the vision and the target condition is defined. Business dictionary describes vision as an aspirational description of what an organization would like to achieve or accomplish in the mid-term or long-term future. The target is.

By target we mean the concrete results we want to achieve, the desired condition:

In the most frequent cases, the vision and the target are defined superficially or are missing at all. By writing down a clear vision and defining a target as detailed as possible, the management points out the destination and gets a more extended view of the road to take: the needed resources, the obstacles to overcome, the actions to take.

For becoming a smart factory in terms of Industry 4.0, the established target should follow the SMART conditions:

S – Specific;
M – Measurable;
A – Achievable;
R – Realistic;
T – Time bound.

B. Describe the actual condition

Considering the established target and vision, the analysis of the current situation needs to be done objectively and in detail. Each aspect connected to the target condition should be mentioned and written down.

C. Identify resources, obstacles and actions

At this point we understand what Industry 4.0 is, we know company's specific, the target is fixed, so we know which technology better feats our production processes, which ones to implement first, which are the limitations, and so on.

Having a clear target to achieve and knowing the current situation, the third step is to point four aspects before the final step:

- Current available resources;
- Needed resources to accomplish the target;
- Obstacles to overcome;
- Concrete detailed actions to take.

The mentioned four aspects are correlated with each other: current resources are compared with the ones needed and by this we identify obstacles to overcome and actions to take.

Step III: Implement / Introduce change

Big changes come in small steps: implementation should be introduced gradually.

Considering the complexity of the concept, a long-term and well-established action plan is needed. A segmentation and prioritization of the projects and actions should guarantee that the factory activity is not affected in time, as not only technology suffers changes, but human resource and costumers, as well. Workforce will gradually adapt to changes and will meet the new requirements through training and certification. A progressive change and a good communication with costumers is needed as well: the moment of launching new technology, the notification regarding the update of online platform and so on.

In some cases, a simulation may be needed before applying the bigger implementation process.

All of the previously defined actions will be prioritized and will then follow the PDCA process and be integrated into the factory's culture and structure.

PCDA is not chosen randomly. Being part of continuous improvement process, it may be considered the Lean Management Driver. As shown in the third step of TDI model (see figure 2), each next step incorporate the previous PDCA actions, steps, result, bringing in this way a continuity and coherency.

An adaptation of Toyota Kata template was done with the aim to facilitate the TDI implementation model (see figure 4).

<table>
<tr><td colspan="3">Process: Implement Industry 4.0 in production</td></tr>
<tr><td>Vision:
Target condition:</td><td>Current condition:</td><td rowspan="2">Obstacles:</td></tr>
<tr><td>Needed resources:</td><td>Current resources:</td></tr>
<tr><td>Actions to take:

Action 1:

Action 2:
…

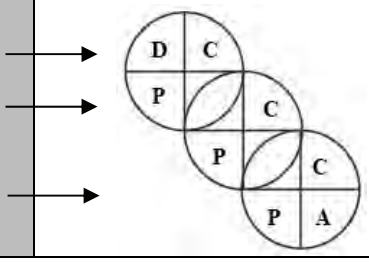
Action n:</td><td colspan="2">PCDA cycles
 
</td></tr>
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Fig. 4. TDI Model Implementation template

Model requirements

For a successful implementation, it is important to meet some requirements first:

- It is highly recommended to use Lean Manufacturing methods before starting to apply the DTI model.
  Prinz C., Kreggenfeld N. and Kuhlenkotter B. (2018) concluded in their recent research study, that Lean is a requirement for implementing Industry 4.0: “Digitization can only be implemented if the organization and in particular the processes have been optimized according to lean aspects”, so the proposed model should be implemented only after this condition is met.
- It is needed to know how PCDA works and use it rigorously.

Conclusions and results

Considering the interlink between Industry 4.0 and Lean Manufacturing and the necessity of a step-by-step algorithm to introduce the new concept, a model was developed. The model was developed by combining two Lean methodological approaches: Toyota Kata and Continuous Improvement with technology-driven approach Industry 4.0 with the goal of identifying concrete steps to take towards digitization. The so-called TDI model contains three major steps and each of them is described in the present paper.

As well, for facilitating the TDI model of Industry 4.0 implementation, an adaptation of Toyota Kata template was developed.

References

Business Dictionary Online
http://www.businessdictionary.com
Gehrke, L., A. Kühn, D. Rule, P. Moore, C. Bellmann, S. Siemens et al.
2015
“A Discussion of Qualifications and Skills in the Factory of the Future: A German and American Perspective”, VDI The Association of German Engineers, Düsseldorf, Germany.
Hirsch-Kreinsen H.
2014
“Wandel von Produktionsarbeit – ‚Industrie 4.0”. In: WSI-Mitteilungen (6) 421–429.
Karre H., M. Hammera, M. Kleindiensta, C. Ramsauera
2017
“Transition towards an Industry 4.0 state of the LeanLab at Graz University of Technology”, Seventh Conference on Learning Factories, CLF 2017, Procedia Manufacturing 9 (2017) 206 – 213.
Liker, J. K.
2004
“The Toyota way: 14 management principles from the world's greatest manufacturer”, New York: McGraw-Hill.
Pietrzak, M. and J. Paliszkiewicz
2015
“Framework of Strategic Learning: The PDCA Cycle”, Management 10 (2): 149–161.
Prinz, C., N. Kreggenfeld, and B.Kuhlenkotter
2018
Lean meets Industrie 4.0 – a practical approach to interlink the method world and cyber-physical world, Procedia Manufacturing 23 (2018) 21-26.
Rojko, A.
2017
“Industry 4.0 Concept – Background and Overview”, International .Journal of Interactive Mobile Technology, Vol. 11, No. 5.
Rother M.
2010
“Toyota Kata, Managing People for Improvement, Adaptiveness, and Superior Results”, McGraw-Hill, New York.

Rother M.
2014
Improvement Kata handbook, online: http://www-personal.umich.edu/~mrother/Supporting_Materials.html
Rother M.
2018
“The Toyota Kata Practice Guide: Practicing scientific thinking skills for superior results in 20 minutes a day”, McGraw-Hill, USA. Online: http://www-personal.umich.edu/~mrother/KATA_Files/TKPG_Intro.pdf.
Spath, D., O. Ganschar, S. Gerlach, M. Hämmerle, T. Krause, S. Schlund
2013
Produktionsarbeit der Zukunft - Industrie 4.0. [Studie]. Hg. v. Dieter Spath. Stuttgart.
Toivonen T.
2015
“Continuous innovation – combining Toyota Kata and TRIZ for sustained innovation”, Procedia Engineering 131 (2015) 963 – 974.
Veres (Harea), C., L. Marian, S. Moica
2017
“Case Study Concerning Effects of Japanese Management Model Application in Romania”, 10th International Conference Interdisciplinarity in Engineering, INTER-ENG 2016, Procedia Engineering, Vol. 181 (2017) 1013–1020.
Villalba-Diez, J., J. Ordieres-Meré, S. Rubio-Valdehita
2016
“Learning Factories Lean Learning Patterns. (CPD)nA vs. KATA”, Procedia CIRP 54 (2016) 147 – 151, 6th CLF - 6th CIRP Conference on Learning Factories.
Windelband L.
2014
“Zukunft der Facharbeit im Zeitalter ,,Industrie 4.0”. In: Journal of Technical Education (JOTED) 2 (2) 138–160.
www.pwc.com/industry40
2016
“Industry 4.0: Building the digital enterprise”. Global Industry 4.0 Survey.
https://www.pwc.com/gx/en/industries/industries-4.0/landing-page/industry-4.0-building-your-digital-enterprise-april-2016.pdf

NEW ERGONOMICS APPROACHES – OPPORTUNITIES FOR INCREASING ROMANIAN ORGANIZATIONS' PERFORMANCE

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Abstract

Purpose *– The purpose of this paper is to present an outline of the latest ergonomics approaches in Romania and to underline some opportunities for increasing Romanian organization's performance. The paper aims to present arguments for considering ergonomics as an instrument for performance management, on one hand, and as a support for management performance on the other hand.*

Methodology/approach *- The research methodology consists of three semi-structured interviews combined with a case study in ergonomics and occupational health and safety management (OH&S). On one hand, a qualitative research was attempted in order to gather an in-depth understanding of managerial perspective on the possibility of influencing the human and management's performance by work standardization and OH&S management. On the other hand, a case study in ergonomics was used to emphasize that the manager has the possibility to bring together the human abilities, the limitations and constrains faced by workers during the work process in order to enhance the work and the organization' performance.*

Findings *– The paper argues that applying ergonomics in designing, redesigning and planning the workplaces is a measure that can be implemented in order to reduce the OH&S risks and to manage the employees' and organization's performance. Opportunities for increasing Romanian organizations' performance were identified.*

Research limitations/implications *– The paper argues that ergonomics and OH&S audits – required by the new ISO 45001:2018 standard – represent an opportunity for organizations' sustainable competitive success and for performance management.*

Practical implications *– The paper presents opportunities for Romanian organizations since a new occupation - Ergonomist - was included in COR (Classification of Occupations in Romania), in February 2017.*

Originality/value *– The paper investigates the ergonomics evolutions, developments and approaches and their contribution to performance management and to management performance.*

Key words: *ergonomics, occupational health and safety, ISO 45001.*

Introduction

The paper presents opportunities for Romanian organizations since a new occupation - Ergonomist - was included in COR (Classification of Occupations in Romania), in February 2017 (Hogas. E., 2017), based on the author's experience as teacher and researcher in Ergonomics and Occupational Health and Safety Management, on one hand, and as a trainee in ISO DIS 45001.2 standard (Stomff S., 2017), on the other hand. The aim of the paper is to demonstrate that ergonomics is not only an instrument for performance management but also a support for management performance. To this end, the paper investigates the ergonomics evolutions, developments and approaches and their contribution to organizational performance.

Background

The necessity of an interdisciplinary study of the work within the production systems was mentioned in mid-20th century when an interdisciplinary group of specialists, led by Hywel Murrell, launched the idea of a multidisciplinary analysis of the systems in which people work, by using a new science – the Ergonomics. The researches conducted in Europe were mainly directed towards analyzing the work tasks, while the American specialists, led by Alphonse Chapanis, were focused on the workspace, equipment and production design.

The term ergonomics derives from two Greek words: ergon (work) and nomos (law) and was used for the first time in 1857, by the Polish biologist Wojciech Jastrzębowski to distinguish between the dangerous, compromising work and the valuable work, which has as benefits pleasure, skills development and happiness (Karwowski W., 2012). Another Polish author, Karol Adamiecki, has developed the theory of work harmonization starting from the assumption that "if the relation of particular fragments of the production process to each other is characterized by harmony, the losses in labor and productivity would decrease" (Lungu R. and Lungu F., 2015). During the same period, Taylorism was developed in the United States and the ideas about scientific management have been spread all over the world.

Unlike the initial developments, when the management's involvement was primordial to the rationalization and efficiency of work, the subsequent developments created a new type of production systems' management. This system was the basis of Japanese management, based on the involvement of employees in the continuous development and improvement of process, with a view to reduce the waste generated within the system. The competitiveness of the Japanese management was recognized at international and European level, by developing Lean management principles and methods.

The previous researches focused on including the human aspects in the implementation of organizational changes by analyzing the connection between ergonomics and Lean Management. It was emphasized that the ergonomics factors which ensure comfort and health protection at the workplace are latent for the employees' involvement in the enhancement of work performance (Firescu V., 2016).

The new ergonomics approaches argue that Ergonomics / Human factors is a systems oriented discipline. As Wilson J. (2014) mentioned, "even within an ergonomics applied to industrial workplaces and physical work, leading ergonomists worldwide have clearly seen that we can only usefully address the relevant human factors concerns at a systems level, whether we call it systems ergonomics, or participatory ergonomics/design or, as has become prevalent in north America at least, macroergonomics." Regarding macroergonomics approaches in Romania, Manolescu A. (2015) mentioned in his book two important aspects: (1) the necessity of introducing a new occupation - Ergonomist - in COR and (2) the necessity of "a new paradigm on the impact of ergonomics on competitive and sustainable success". Due to his team effort, the occupation of Ergonomist was included in COR (code 226309), in February 2017, and the "Occupational Standard for education and training for ergonomist occupation / profession" was developed (Manolescu A., 2017).

Ergonomics and ISO 45001:2018

The new ISO 45001:2018 Occupational health and safety (OH&S) management system standard was published in March 2018. The standard enables organizations to manage their OH&S risks and to improve their OH&S performance. "The adoption of an OH&S management system is intended to enable an organization to provide safe and healthy workplaces, prevent work-related injury and ill health, and continually improve its OH&S performance" (ISO 45001:2018).

Taking into consideration that, starting this year, companies will be audited, evaluated and recertified based on ISO 45001:2018 standard instead of OHSAS 18001:2008, the Romanian companies have to be ready to use this opportunity and to apply the new standard. The standard was translated in Romanian language (SR ISO 45001:2018) and its structure is similar to that of ISO 9001:2015, which allows them to be easily integrated.

These new approaches in OH&S management systems link ISO 45001:2018 to Ergonomics. "Applying ergonomics approaches when planning new workplaces; eliminating monotonous work or

work that causes negative stress" are mentioned measures that can be implemented at each level for eliminating hazards and reducing OH&S risks.

Research purpose and methodology

The research purpose was to underline some opportunities for increasing Romanian organization's performance by presenting arguments for considering ergonomics as an instrument that supports work systems' performance. The research methodology consists of one case study in ergonomics and OH&S management combined with three semi-structured interviews.

On one hand, an ergonomic study was used to emphasize that the manager has the possibility to bring together the human abilities, the limitations and constrains faced by workers during the work process in order to enhance the work and the organization's performance. The study was done in May 2016 within a metal fabrication workshop in Bistrita County (Romania). The Task Analysis method was used in order to record and analyze the workers' activity – assembling and welding of decorative edges at fences and metal gates.

On the other hand, a qualitative research was attempted in order to gather an in-depth understanding of managerial perspective on the possibility of influencing the human and management performance by ergonomics, work standardization and OH&S management. In order to describe lived experiences of individuals about applying ergonomics in Romanian organizations, a phenomenological research (Creswell, J. 2014 apud Smith, C., Kourouklis, A., Cano, M., 2018) was used. The tool used was the semi-structured interview. The participants profile is presented in Table 1.

Table 1. The profile of participants in qualitative research

 Identifier: R1	Role: work standardization manager Industry/ sector: automotive industry/ production and development of electronic control units
 Identifier: R2	Role: trainer Industry/ sector: management systems/ occupational health and safety management
 Identifier: R3	Role: quality manager Industry/ sector: software development industry/ quality and employee satisfaction

The participants in the interview were from various industry sectors. The key characteristic that differed between each participant was its organization's current position in relation to the ergonomics implementation in the organization. The respondent R1 was an engineer, holding a manager position with direct responsibility for the implementation of ergonomics within the organization. She was interviewed in February 2016 during a visit at the company's headquarters. The respondent R2 was a trainer in OH&S management standards, holding a project manager position at ASRO (Romanian Standards Association). She was interviewed in October 2017 during ISO DIS 45001.2 standard training. The respondent R3 was an engineer, holding a quality manager position in a software development company and implicated in employee satisfaction assessment. She was interviewed in February 2018 during a visit at the company's headquarters.

Findings and results

Case study: Ergonomics – an instrument for performance management

Purpose: The study aimed the ergonomic analysis of the preparation, assembling and welding of decorative edges at fences and metal gates, in order to eliminate workers' problems and increase work performance. The goal of this study by Bob P.A. and Firescu V. (coordinator) was to examine and improve a manual work activity in a metal fabrication workshop, where the work is difficult, takes very long time and the quality of welding is low, especially at the decorative edges. The work process

was analyzed to determine the ergonomic risks that contribute to low efficiency, discomfort and musculoskeletal disorders, including the assessment of the work posture, material handling, environment etc.

Context: The workers face problems like physical fatigue and pains in the shoulders, arms and back that occur especially in the second part of the day or after a long production cycle. They also experience uncomfortable eye and respiratory system disorders. Work accidents were reported, even if not too serious: hand or foot burns, cuts and temporary visual affections.

Method: The method used for the ergonomic investigation of the working process consists of analyzing the work tasks themselves in order to identify potential ergonomic problems and to determine if the work presents ergonomic risks.

Results: Several ergonomic risks were identified and solutions to eliminate or diminish the constraints at their origin were proposed, as Table 2 shows.

Table 2. Identified ergonomics risks and methods for their elimination or diminishment

Cause of the problem	Targets	Methods/ Solutions
Problem P1: Injury and burning of hands and face		
C1. Maintaining an unfavorable posture when holding the edges in place, the hand being too close to the welding flame	Using a tool with which the worker can keep the edges in place, thus having a greater distance from the welding flame	S1. Finding a suitable tool to keep edges and the welding flame at a greater distance from the worker. If a suitable tool is not found, designing a new one.
C2. Hitting the slag with the hammer, which breaks and flies in all directions	Using another welding method, one that does not leave slag after welding.	S2 Investing in a new welding machine that uses other technology and does not leave slag
Problem P2: Muscles fatigue and back pain		
C3. Maintaining an uncomfortable posture, in an orthostatic position, bent with knees bent	Eliminating this manual action from the work cycle	S3. Designing an automated welding device that will weld bars, including decorative edges
Problem P3: Difficult breathing and respiratory disorders		
C1. Maintaining an unfavorable posture when holding the edges in place, the hand being too close to the welding flame	Better protecting the welder against inhalation of process emissions	S4. Providing an automated professional headband welding mask with light and self-closing sensors
C4. Lacking in exhaust gas system	Decreasing the amount of toxic gas	S5. Equipping the workshop with a better room ventilation system
Problem P4: Eye disorders		
C2. Hitting the slag with the hammer, which breaks and flies in all directions	Eliminating this manual action from the work cycle	S2 Investing in a new welding machine that uses other technology and does not leave slag
C5. Non-synchronization of workers	Eliminating this manual action from the work cycle	S3. Designing an automated welding device that will weld bars, including decorative edges
Problem P5: Interruptions of work		
C6. Need to replace the welding electrode	Eliminating electrode welding	S2 Investing in a new welding machine that uses other technology and does not use electrodes
Problem P6: Welding errors		
C7. Insufficient lighting	Installing a better lamp to increase lighting	S6. Replacing the lighting system
C8. Using an unprofessional welding mask	Replacing the welding mask with a professional one	S7. Investing in a dim helmet welding mask
C3. Maintaining an uncomfortable posture, in an orthostatic position, bent with knees bent	Eliminating manual welding	S3. Designing an automated welding device that will weld bars, including decorative edges

Conclusions: At the end of the task analysis, eight hazards (sources with a potential to cause injury and ill health) and six ergonomic risks were identified. The proposed solutions aim redesigning the technical system and the operational organization, investing in new tools and technologies, ventilation and lighting systems and protection equipment. All these solutions should reduce OH&S risks and increase work performance, being instruments that contribute to performance management.

Interviews: Ergonomics – a support for management performance

Purpose: The three interviews aimed the description of lived experiences of respondents about applying ergonomics in Romanian organizations.

Context: The interviews were made in different moments, before and after the publication of the Ergonomist news occupation in COR – the moment that officially recognized the Ergonomist occupation and profession in Romania and allowed Romanian companies to officially hire a specialist in Ergonomics.

Method: The research strategy contained common themes and potential gaps identified during the literature review process to form a set of questions that were used as a research tool.

Results: Using interpretative phenomenological analysis the key themes of discussion were categorized as (see Table 3):

- ☎🗁◑ Why Romanian companies apply ergonomics?
- ☎🗎◑ What person in the company applies ergonomics?
- ☎🗏◑ What are the ergonomic solutions applied in the company?

Table 3. The answers of the interviewees to interview's questions

Respondent R1 (2016, automotive industry)	Respondent R2 (2017, management systems)	Respondent R3 (2018, software industry)
Theme of discussion: Why companies apply ergonomics?		
The application of ergonomics is a company's production system requirement although the employment laws in Romania provide no such obligations for the companies.	The lack of ergonomic workplaces is an OH&S risk.	Employee satisfaction assessment procedure requires employees' feedback and solutions for environmental improvements; based on satisfaction assessment results ergonomic solutions are implemented.
Theme of discussion: What person in the company applies ergonomics?		
standardization specialist	OH&S specialist	human resource specialist
Theme of discussion: What are the ergonomic solutions applied in the company?		
Ergonomic office work – ergonomic office chairs and tables are used MTM (methods time measurement) system is the basis for: creating a working method, calculating the time and the number of operators on the production line Ergonomic analyses are implemented and each workplace is re-evaluated based on checklists every 2 years.	A new section in the ISO 45001:2018, that was absent in OHSAS 18001:2008, regards 6.1.2.3 Assessment of OH&S opportunities and other opportunities for the OH&S management system. We should include here: - integrating OH&S requirements from the design phase of the machines - improving monotonous work - opportunities to eliminate hazards and reduce OH&S risks - opportunities to adapt work, work organization and work environment to workers	Ergonomic office work – ergonomic office chairs are used; at the recommendation of the Labor medicine doctor, some employees use spine chair support. Through the internal regulation, a 10-minute break at 2 hours is allowed; Recreation areas were created, where employees can play backgammon, darts or ping-pong during the breaks.

Conclusions: By integrating the points of view coming from ergonomics, occupational health and safety and work standardization, the study promotes the central role of ergonomics in eliminating hazards, reducing OH&S risks and increasing organizational performance.

Discussion and conclusions

The legal framework for hiring an Ergonomics specialist in Romanian organizations has been established since February 2017, when the Ergonomist occupation was included in COR. By now, the ergonomics principles, methods and analyses were applied within Romanian organizations by human resources, work standardization or occupational health and safety specialists.

The importance of applying ergonomics work analysis was outlined through the results of a case study that emphasizes the idea that the manager has the possibility to bring together the human abilities and the constraints faced by workers during the work process in order to enhance work performance and to ensure performance management. Opposed to this, during ISO 45001:2018 certification, the lack of ergonomic workplaces can be considered an OH&S risk that can decrease the organization's OH&S performance.

The employment laws in Romania provide no obligations for the companies in applying ergonomics but the paper outlines two opportunities for Romanian companies to demonstrate their management performance: (1) the company's production system requirements for ergonomics and (2) the new requirements of ISO 45001:2018 that regard assessment of OH&S, including applying ergonomics approaches when planning new workplaces.

References

Bob, P.A., and V. Firescu (coordinator)
2016
"Ergonomic analysis of the activity of mounting and welding ornamental caps at fences and metal gates" Thesis presented at The Technical University of Cluj-Napoca, Cluj-Napoca, RO.
Firescu, V.M.
2016
Integrated Work Planning. Saarbrücken, GE: LAP LAMBERT Academic Publishing.
Hogaş, E.
2017
"OFFICIAL: 28 new occupations introduced in COR." https://legestart.ro/28-de-noi-ocupatii-introduse-cor/.
ISO 45001:2018
2018
Occupational health and safety management systems – Requirements with guidance for use.
Karwowski W.
2012
"The Discipline of Ergonomics and Human Factors", in: G. Salvendy (editor), *Handbook of Human Factors and Ergonomics*, Fourth Edition, John Wiley & Sons: 3-37. Hoboken, NJ.
Lungu, R., and F. Lungu
2015
"Karol Adamiecki, pioneer of scientific organization of labor and European representative of scientific management." Review of Management and Economic Engineering: 14, 428-436.
Manolescu, A.
2017
„Occupational Standard for education and training."
http://www.anc.edu.ro/standarde_app/SO/Ergonomist.pdf.
Manolescu, A.
2015
Organizational Ergonomics. Bucharest, RO: Economica Publishing.
Smith, C., A. Kourouklis, and M. Cano
2018
"ISO 9001:2015 Introduction of Explicit Risk-Based Thinking – Benefit or Limitation?." Asigurarea calitatii – Quality assurance, 94: 29-40.
Stomff, S.
2017
"ISO DIS 45001.2 - What novelty brings the draft of International Standard for Occupational Health and Safety Management" Training material presented at Romanian Association of Standardization (ASRO), Bucharest, RO.
Wilson, J.
2014
"Fundamentals of systems ergonomics/ human factors." Applied Ergonomics, 45: 5-13.

POSSIBILITIES OF INCREASING THE EFFICIENCY OF THE PRODUCTION OPERATIONAL MANAGEMENT BY USING MODERN VERSIONS OF CAD/CAM SYSTEMS

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Abstract

Purpose *- The paper approaches the production authorization issue at workshop level, therefore it was developed a simulation algorithm, based on a consistent set of hypothesis regarding the organization and operation of such department. The iterative optimization procedure is described related to a performance index for the workshop operation.*

Methodology/approach *- The major objectives of the systems are: ensuring the fulfillment of the fabrication program, increasing the efficiency of using the production means and workforce, the reduction of the fabrication cycles and of the stocks of used semi-products, the better correlation with the adjacent workshops and auxilliary activities.*

Findings *– The algorithm presented by the paper was used to elaborate a program in MATLAB which was implemented in a system using personal computers – where the production authorization represents one of the functions of the management system of discreet type production. Currently the algorithm is adapted to varioys hypothesis imposed by the user when the system is generated.*

Research limitations/implications *– For discreet type production conditions, at production workshop level, the workshop head gets periodically from the superior level the fabrication program for the following interval of time. The fabrication program contains data regarding the future works, their fabrication technology, the operations to be done and their order and standard times - preparation, processing and transport.*

Practical implications *– The production operation management needs to ensure: customer knowledge, work minimization, reduction of production change times, enhancement of production cycles, quality optimization and continuous improvement of production factors.*

Originality/value *– The paper suggests an optimization algorithm for the production worshop level authorization, which uses the simulation as evaluation procedure for the solution quality. Also, the paper presents the objectives of the real time production management system and the suggested optimization algorithm.*

Key words: *production schedule, optimization, hierarchical system.*

Introduction

Operational management represents the main production factor, being a substantial economic resource, mainly ensuring an efficient use both for work and for capital towards productivity increase. Within the organizational management system, the operational management establishes as main objective keeping the production within the parameter limits for quality, quantity and time, imposed by the basic characteristics of production, in an optimal ratio of economic efficiency.

Depending on the operational analysis, the basic parameters of operational management are: operational period (the period between the maximum time limit of the production cycle imposed by the delivery time and the technologic minimum time limit), the environmental integration capacity and

adaptation to its changes, the functional structure and density, the characteristics of the regulation mechanism - administration times, regulation times, the variety of adjustable parameters, their sensibility and stability, etc.-, the informational processuality, decision capacity, organization characteristics, response qualification levels -opportunity, efficiency, accessibility, detectability, observability, control -, and also operation safety and its technical support maintenance (Ilie Gh., Ştefănescu R., 2003).

Computer-aided design - CAD, may be defined by a usage activity of a computer in for design projection, modification, analysis and optimization.

The computer is composed of equipment and programs which ensure the functions needed for design. The CAD activity equipment is composed of a computer, one or more graphic terminals, keyboard and other peripherals. The CAD programs are applications for graphic implementation to a computer, to which are added the engineering function programs which may achieve the analysis of the tensions and strains of some elements, the dynamic analysis of mechanisms, heat transfer calculation and numerical control. The applicative programs vary from one user to another, depending on the production line type, on the fabrication process and the sale market specifics.

In time, there were developed programs which help in managing the costs of a product for its entire life cycle, from its design to the recycling.

Computer-aided manufacturing – CAM consists in using a computer for the operation planning, management and control in a factory, using any direct or indirect interface between the computer and the production resources. There are two main categories of CAM applications:

- - monitoring and control; for these applications the computer is directly connected to the fabrication process with the purpose of its monitoring and control;
- - factory support; these are indirect applications where the computer is used as support for production operations, without any direct connections between the computer and fabrication process.

The literature uses CAD/CAM as an acronym for computer design and manufacturing. This innovative technology which uses computers for achieving various design and manufacturing functions has the tendency of total integration of such activities which traditionally were considered as two separate functions. All-together, CAD/CAM develops the advanced technology of future enterprise, completely assisted by computer.

The main domains which use CAD/CAM are: architecture, constructions, roads and bridges, aeronautics, vehicle industry, electronics, industrial design, mechanical engineering and other industrial branches (Buşe Gheorghe-Florin, 2017), (9 Stoica L., 2011).

The CAD/CAM software is used to increase the designer productivity, to increase the design quality, to improve the communication through documents and to create a production database. The CAD/CAM outputs are usually electronic files for printing, processing and other manufacturing operations. Its use in mechanical design is known as Mechanical Design Automatization - MDA or Computer-Aided Design - CAD, which includes the process of creating a technical design by using software.

The CAD/CAM software for mechanical design uses vector based graphics to describe the traditional elaboration objects or may also produce raster graphics which shows the general aspect of designed objects. However, this implies more than forms. Just as the manual elaboration of technical graphics and engineering, the CAD production should send information regarding materials, processes, dimensions, allowances regarding the application. Due to its huge importance, CAD was a major leading force in computer geometry research, computer graphics (both hardware and software) and discreet differential geometry.

The paper aims to describe an schedule optimization algorithm at production workshop level which uses the simulation as solution quality evaluation procedure.

The paper presents the objectives of the management system in real time production and the suggested optimization algorithm.

The CAD/CAM system concept

In engineering, the CAD/CAM technology is used in multiple ways by various specialist groups, as follows (Ivan N. V. et al., 2003):

- The first category does the design and documentation;
- The second category uses the visual instruments for shadowing and animation effects;
- The third category analyses the geometric models, such as finit element analysis;
- The fourth category develops the manufacturing technology and programs the numerical command machines.

As a consequence of design requirements, the CAD programs usually includes complex procedures of engineering analysis.

The modern concepts of CAD/CAM systems impose their organization in a hierarchical modular structure with data base processing methods for concepts of multilevel distributed system (Tvirkun A. D, 1982).

Computer applications, included in the category of industrial processes, include tracking, for example: auto traffic tracking, product testing and quality control, pouring process tracking, numerical tracking equipment, spatial engineering research, neurologic and bio-medical research, nuclear plant control and monitoring, energetic system control and monitoring, railroad merchandise transport monitoring, concrete enterprise tracking, oxygen oven tracking, cracking operations in oil refineries, etc.

Within a hierarchical system, the real time production management is not just a passive recording of process operation history and real time information sharing on its current state, but ensures the possibility of comparing the real trajectory to the predicted one (Tvirkun A. D., Akinfiev V. K., and Soloviev M. M., 1983).

In order to make decision making more efficient and quick, it should be developed the system capacity of operatively giving and supplying decision options for solving critical problems in the evolution of the managed system.

At operation level, the decision suggestions given by the computer are generally based on characteristic models of the well-structured problems (Sprague R. H., Walson H. Y., 1977).

The production cycle and CAD/CAM technology

A well understanding of the CAD/CAM purpose in the activity of an enterprise needs a preliminary examination of various activities and functions which should be fulfilled in designing and manufacturing of a problem, within a production cycle.

A production cycle is lead by: clients, market which desires a certain product.

In some cases, the design functions are done by a client and the production is ensured by a company. In every situation, the production cycle starts with a product concept or idea.

The concept is developed, analyzed, improved and put into a production plan through an engineering design process. The plan is documented by the creation of a set of engineering graphics which shows the product and ensures a series of specifics which indicate how it can be done. Figure 1 presents the design and manufacturing activities of the product.

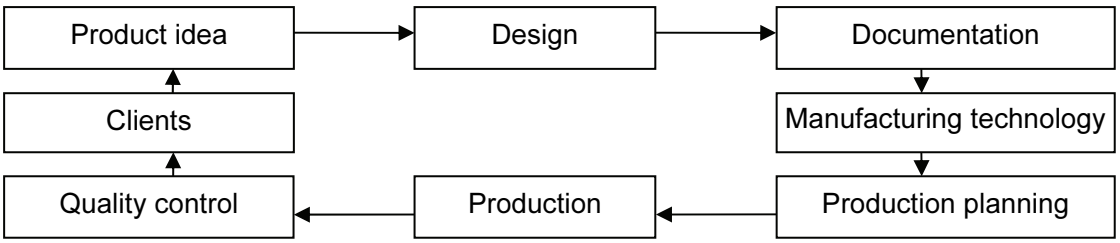

Fig. 1. The design and manufacturing stages of a production cycle

The technologic file includes the operations and stages needed for product manufacturing. The influence of the CAD/CAM technology is shown in all the activities of the production cycle, as it results from figure 2.

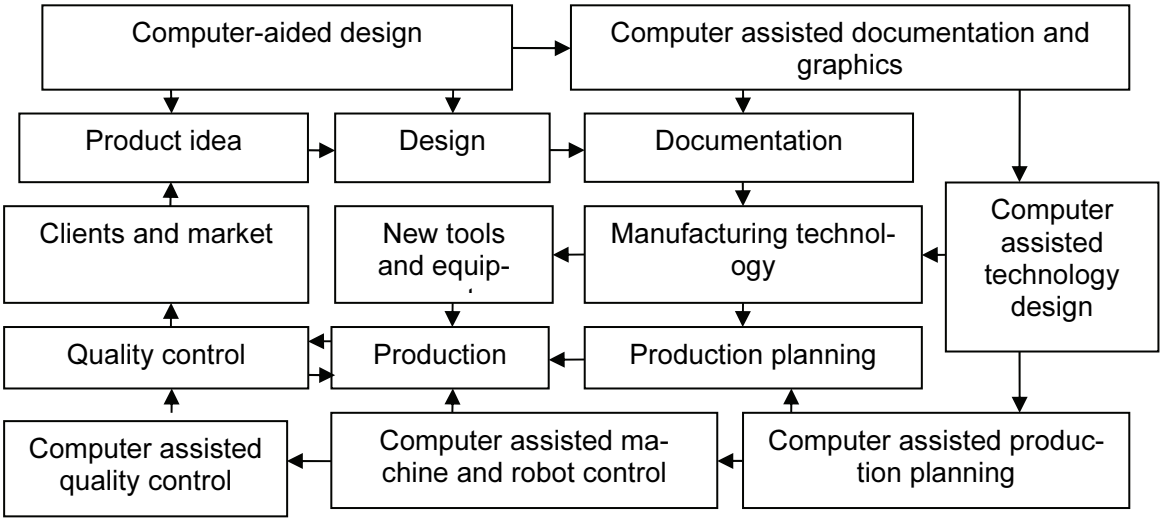

Fig. 2. Production cycle connected to CAD/CAM technology

Computer aided design and automatic documentation are used in the product conception stage. The computers are used to design the manufacturing technology, to plan the production in optimum conditions and to provide quality products.

The objectives of the real time production management system

Fir discreet type production at workshop level, the workshop head gets periodically from the superior management the manufacturing program for the following period. The manufacturing program contains data on future works and its manufacturing technology, like the operations to be done and their order and standard times (preparation, processing and transport).

A real time production leading system at workshop level allows the implementation of the manufacturing program at this level. The system is oriented on events regarded as discontinuities in the production process development.

The major objectives of the system are: the fulfillment of the manufacturing program, the efficiency increase of the production factors and work force, the reduction of production cycle periods and semi-product stocks, the relationship improvement with adjacent workshops / departments and auxiliary activities.

The list of significant events is shown in table 1.

The schedule function is a central function in production management and its fulfillment depends on the manufacturing program given and the current state of the workshop. In order to get an schedule solution it may be used a simulation procedure which displays the list of significant events, containing mainly the optimum sequence of work assignation on machines on an schedule interval, ΔT.

Table 1. List of significant events

No.	Signification
1.	Workshop input
2.	Work enters the waiting line of a machine group for performing the following operation
3.	Starting the work operations
4.	Finishing the work operations
5.	The machine goes into the unexpected unavailability state
6.	The machine gets available after breakdown
7.	The machine goes into the planned unavailability state (maintenance, planned reparations)
8.	The machine gets available after planned unavailability
9.	The machine goes into the planned stationary mode (rest, worker unavailable, lack of electric energy, etc.)
10.	The machine gets available after the stationary period
11.	Workshop activity ends

Observations:

a) We underline that every schedule problem is restricted in time and space because of the hierarchical character of the management, based on the use of structural and time decomposition towards the real time requirement fulfillment.
b) If there are no significant disturbances, the schedule solution will be used on a single availability interval ΔTv. After this interval it is needed the supply of new information from the above level and, as a consequence, of an updated schedule solution. In order to increase the reliability of the system in case of data processing and communication equipment breakdown, the schedule horizon is smaller than the availability interval (Ivan N. V. et al. 2003).
c) Sometimes, in order to compensate the effect of significant disturbances, it is needed the real time reestablishment of the schedule solution.

Algorithm for the real time schedule *of* discrete type production in *work*shops

Workshop characteristics

The discreet simulation model described below is based on ten hypothesis regarding the workshop:

1. The workshop contains a number G of machine groups, every group G_i ($G_i \in$ G) being formed of one or more machines (work posts) technologically identical, M_i^m ($M_i^m \in M_i$), who take their works from the group waiting line.
2. There is a number of L works; the works L_i ($L_i \in$ L) enter the workshop in various time moments, ta_i. They require one or more processing operations, R_i^k ($R_i^k \in$ R), from entering to leaving the workshop. The works come from other workshops in the input store.
3. Every work has or not a planned delivery time, tl_i. The first works are the ones of the lot L_1, the others of the lot L_2 and it is considered that tl_i is ∞ for $L_i \in L_2$.
4. An operation on a certain machine must be done for all the parts of the execution lot before starting another operation for another work.

5. There is a transition time, tt_i^k, of the work L_i from one machine group to another towards executing the operation R_i^k.
6. For every operation on a work the processing times are known, t_i^k.
7. If a machine M_i^m becomes available, it is given the work with the highest priority in the waiting line of the lot it is part of.
8. If two successive technologic operations on the work L_i are planned on the same machine group, they are executed successively on the same machine, except the case when, during the execution of the first operation, it interferes with the start of the maintenance period of the machine. In this case, we try to place the work on to another machine from the same group. If this is not possible, the work is passed to the waiting line of the lot.
9. There are reparation and maintenance intervals given for every machine. If in the beginning of such interval the machine is occupied with a work, the interval is translated at the end of the current operation on the machine.
10. For every machine there may be periods of passing to a planned stationary mode (rest, worker unavailable, lack of electric energy, etc.). If in the beginning of such interval the machine is occupied with a work, its execution is interrupted.

The priority rule

In order to establish the work which will be distributed on an available machine, it is used a rule of composed priority (Filip F. G., Donciulescu D. A., 2004, pp. 317-320).

This rule takes into consideration, for every work L_i, the following criteria: external priority, $P_{e,i}$, the Carroli rule, $P_{l,i}$, the waiting time of the machine lot, $P_{2,i}$, the time of processing left compared to the current processing time, $P_{3,i}$ and the dimension of the waiting line for the following operation, $P_{4,i}$.

The work priority L_i is determined as follows:

$$P_i = P_{e,i} \cdot \sum_{\eta=1}^{4} w_\eta \cdot P_{\eta,i}$$

where the share coefficients $\{w_1, w_2, w_3, w_4\}$ are determined by an optimization procedure in two stages. We note that every criteria may be used as a filter, defined by initial and tolerance parameters, with the purpose of clearing the works that are not critical.

The simulation algorithm

Using the algorithm described below, we may get the schedule of the works in a production workshop for a time interval when we know the work characteristics and workshop state (Emery J. C., 1969).

The algorithm provides a sequence of significant events, scheduled on the moments of their appearance, saved in the future events file, named FEV.

We note that the events 5 and 6, which are not predictable, are not taken into consideration by the algorithm. For internal reasons it was introduced a fictional event, 12 (the arrival of a work in front of a machine lot).

The algorithm is launched when the manufacturing program is received and when is needed the update or restoration of the work execution graphic.

The schedule horizon is established by the operator at algorithm launch.

The algorithm goes through the following steps:

Step 1. We determine the closest future event and is deleted from the FEV file.

Step 2. We determine the nature of this event and act consequently:

S2.1 If the future event is the arrival of the work L_i in the workshop store, we go to step S3.

S2.2 If the future event is the entry of the work L_i in the waiting line of the lot G_i for executing the operation R_i^k, we go to step S4.

S2.3 If the future event is the start of the operation R_i^k for the work L_i, we go to step S5.

S2.4 If the future event is the end of operation R_i^k for the work L_i on the machine M_i^m, we go to step S6.

S2.5 If the future event is the start of a planned reparation for the machine M_i^m, we go to step S10.

S2.6 If the future event is the function restoration of the machine M_i^m after an event type 7, we go to step S7.

S2.7 If the future event is putting the machine M_i^m in the planned stationary mode, we go to step S11.

S2.8 If the future event is the function restoration of the machine M_i^m after an event type 9, we go to step S12.

S2.9 If the future event is finishing the work L_i in the workshop, we go to step S13.

S2.10 If the future event is the arrival of the work L_i to the machine lot G_i for the operation R_i^k, we go to step S14.

Step 3. We identify the machine group needed to do the first operation on the work L_i and determine the moment of arrival of the work L_i to this group. We update the file FEV with the future event for the work L_i and its arrival to the lot G_i. We go to step S1.

Step 4. We keep the moment of entry for the work L_i in the waiting line of the lot G_i. We go to step S1.

Step 5. We determine the moment of execution end of the current operation on the work L_i. We update the FEV file with the future event for the work L_i, ending the current operation. We go to step S1.

Step 6. We test if there are operations left to do on the work L_i:

- If "*YES*" and the following operation is on the same machine lot and during the previous operation execution it didn't occur a current maintenance period for the machine M_i^m, we go to step S5.
- - If "*YES*" and the following operation is on the same machine lot, but during the previous operation execution it occurred a current maintenance period for the machine M_i^m, we go to step S14.
- - If "*YES*" and the following operation is on another machine lot, we go to step S7 and then to step S8.
- - If "*NO*", we go to step S7 and then to step S9.

Step 7. We test if there are further works in the waiting line of the machine lot G_i.

- If "*YES*", the machine available is occupied by the work with the highest priority, L_i, from the waiting line. We go to step S5.
- If "*NO*", the machine remains available, we go to step S1.

Step 8. We calculate the moment when the work L_i will be ready to be processed on the machine lot needed to do the following operation. We update the FEV file with future event for the work L_i and its arrival to this machine lot. We go to step S1.

Step 9. We generate and register to the FEV file the future event for the work L_i (ending the work L_i in the workshop). We go to step S1.

Step 10. - If the machine M_i^m is occupied, the starting moment of the planned reparation period for the machine M_i^m is modified, to the moment of ending the current operation on the machine M_i^m. We go to step S1.

– If the machine M_i^m is available, we go to step S1.

Step 11. - If the machine is available, we go to step S1.

– If the machine is occupied with the work L_i for the operation R_i^k, we calculate the processing time remaining corresponding to this operation. We generate a new event type start of operation for the work L_i at the moment of restoration of the machine M_i^m after an event type 9. We update the moment of current operation ending according to the remaining processing time for the operation R_i^k. We go to step S1.

Step 12. - If the machine is available when a new event type 9 occurs, we go to step S7.

– If "*NO*", we go to step S1.

Step 13. The paper is removed from the workshop. We go to step S1.

Step 14. We test if there are available machines in the lot G_i.

– If there is a single available machine we update the FEV file with the future event for the work L_i the start of operation R_i^k for the work L_i on this machine. We go to step S1.

– If there are multiple machines available, we choose the machine which was unloaded the longest. We update the FEV file with the future event for the work L_i the start of operation R_i^k on this machine. We go to step S1.

– If there are no machines available we update the FEV file with the future event for the work L_i its entry to the waiting line of the lot G_i. We go to step S1.

The algorithm ends where there are no further events in the FEV file.

The optimization of the schedule solution

As we pointed out, the future evolution of the workshop may be simulated in a succession of significant events, for a time interval, ΔT.

The appropriate choice of the values of share coefficients $w_\eta, \eta = \overline{1,4}$ is vital for the schedule efficiency. The establishment of optimal values of share coefficients requires the definition of a performance index. This index has an obvious economic significance. It indicates, for every sequence obtained through simulation, the size of penalties due to the overcome, $\Delta t_{1,i}$, or the outrunning, $\Delta t_{2,i}$, of the work delivery term, tl_i (Filip F. G., Donciulescu D. A., 2004, pp. 317-320). In order to reduce the manufacturing flow, the penalty function takes into consideration the stationary time of the work L_i in the waiting line Δt_3. Since, beside reducing the manufacturing flow and keeping the delivery terms, it is necessary an efficient use of the production factors, the penalty function considers the time the machine M_i^m was unloaded, $\Delta t_{4,m}$. In order to avoid the top moments in energy consumption, there are penalized the combination of works, operations and machines, cp_{imk}, which lead to an excessive consumption of energy. As a consequence, the performance index has five components: $I = I_1 + I_2 + I_3 + I_4 + I_5$, where:

$$I_1 = \sum_{L_i \in \mathcal{L}_1} Q_{1,i}(\Delta t_{1,i}), \quad \Delta t_{1,i} = \begin{cases} \Delta t_{1,i} = tf_i - tl_i, \, if \; tf_i > tl_i \\ 0, \, otherwise \end{cases}$$

$$I_2 = \sum_{L_i \in \mathfrak{L}_2} Q_{2,i}(\Delta t_{2,i}), \quad \Delta t_{2,i} = \begin{cases} \Delta t_{2,i} = tl_i - tf, \, if \; tf_i < tl_i \\ 0, \, otherwise \end{cases}$$

$$I_3 = \sum_{L_i \in \mathfrak{L}_3} Q_{3,i}(\Delta t_{3,i}), \quad \Delta t_{3,i} = \sum_{R_i^k \in \Re_i} tw_i^k$$

$$I_4 = \sum_{\substack{M_i^m \in \mathfrak{M}_i \\ G_i \in \mathfrak{G}}} Q_{4,m}(\Delta t_{4,m})$$

$$I_5 = \sum_{e \in \mathfrak{E}} Q_{5,e} cp_{imk}$$

where e is the amount of events type 3 (the start of an operation R_i^k of the work Li on the machine M_i^m).

The penalty functions Q_ξ, where $\xi = (\beta, \gamma)$, $\beta \in \{1, 2, 3, 4, 5\}$ and $\gamma \in \{\mathfrak{L}_1, \mathfrak{L}, \mathfrak{M}, \mathfrak{E}\}$, are considered linear on parts.

The penalty is calculated with cost coefficients monotonous increasing, $c_{\xi,\upsilon}$, where $\upsilon = \overline{1, N(\xi)}$, as follows:

$$Q_\xi = \Delta t_\xi \cdot c_{f,\, N^*(\xi)} \sum_{\upsilon=1}^{N^*(\xi)} \alpha_{\xi,\upsilon}(c_{\xi,\upsilon} - c_{\xi,\upsilon-1})$$

where $N^*(\xi)$ is defined by the double inequality:

$$\alpha_{\upsilon,\, N^*(\xi)} \le \Delta t_\xi < \alpha_{\upsilon,\, N^*(\xi)+1}$$

The optimum values of the share coefficients w_η, where $\eta = \overline{1,4}$, are found by a linear search method Gauss type, where very iteration corresponds to the simulation of workshop evolution (Văduva I., 2004). Since the values of the share coefficients are relatively stable, we recommend this search to take place only in the „programming phase", when the first schedule solution is built.

Possible adaptations which consist in real time rescheduling - in case of need - of the schedule horizon, are basically simulations on shorter intervals, compared to the initial optimization based on the concept of "sliding horizon" (Filip F. G., Donciulescu D. A., 1983, pp. 317-320).

Conclusions

The main objective of the production operational management is the aggregation of the discontinuous and direct elements in a continuous production process, capable of ensuring the efficient use of the production capacities, the maximum utilization of the raw material base and superior use of work force. In order to fulfill the production system functions of production planning, launching and tracking, the production operational management executes its functions of prevention, organization, management, coordination and control.

The use of the optimization algorithm in two stages, based on simulation for the evaluation of the performance criteria, is adequate for solving the medium level schedule problems. In case of work rescheduling in case of time restrictions, a single simulation may be used.

The algorithm presented by the paper was implemented in a system which uses PC computers – where the production schedule represents one of the production management system discreet type functions.

Currently we try to adapt the algorithm to different hypothesis imposed by user when the system is generated.

References

Buşe, Gh.F.
2017
Production systems engineering (in Romanian), Universitas Publishing House, Petroşani
Emery, J.C.
1969
Job Shop Scheduling by Means of Simulation and on Optimum-Seeking Search. Proceedings of The Third Conference of Applications of Simulation, Los Angeles, SUA
Filip, F.G., Donciulescu, D.A.
1983
On a method of online dynamic coordination for industrial processes (in Romanian). In: Automatica, vol. 19, nr.3
Ilie, Gh., Ştefănescu, R.
2003
Carachteristics of the production operational management (in Romanian), AISTEDA Publishing
Ivan, N. V., Berce, P., Dragoi, M. V., Oancea, G., Ivan, M. C., Balc, N., Lancea, C., Udroiu, R., Vasiloni, A.M., Mihali, M., and Ivan, C.
2003
CAD/CAPP/CAM systems. Theory and practices (in Romanian), Technical Publishing, Bucureşti
Sprague, R. H., Walson, H. Y.
1977
MIS Concepts, Interactive Decision Oriented Data Base Systems - W.C. House (ed. Petrocelli/Charter, New York)
Tvirkun, A. D.
1982
Osnovy sinteza struktury slozhnykh sistem, Izdatel'stvo "Nauka", Moskva
Tvirkun, A. D., Akinfiev, V. K., and Soloviev, M. M.
1983
Modelirovaniye razvitiya krupnykh system, Izdatel'stvo "Nauka", Moskva
Stoica, L.
2011
Architecture digital design (in Romanian), ARCHI DESIGN Publishing, Bucureşti
Văduva, I.
2004
Simulation models, Bucharest University Publishing, București

A CRITICAL ANALISYS REGARDING MODELING AND SIMULATING THE FUTURE AIR TRAFFIC FLOW AND CAPACITY MANAGEMENT PROBLEMS. PART 1: ROUTE CHALLENGES

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Abstract

Purpose *– Solution for the increase of Air Traffic Flow and Capacity Management are researched by Single European Sky ATM Research and Next Generation Air, for the concept of free routes and 4D vectoring for some time now, however the technology for the implementation of this issue has not been revealed.*

Methodology/approach *- A Multi-Agent System is used to simulate important aspects of the Air Traffic Management system.*

Findings *– In the proposed model, some processes are simplified however it is unique, it is believed that the model can be used as it is to predict air traffic behavior when the Air Traffic Management system will implement them.*

Research limitations/implications *– The model is not perfect, for example it does not take into account future Air Traffic Management enhancements in procedures.*

Practical implications *– This system will serve many users of the airspace such as: air traffic controllers by increasing its capacity to handle aircrafts, military ground control intercept controllers responsible for different types of military mission.*

Originality/value *– The prosed model is a theoretic concept of a multi-agent system design, simulated in NetLogo software which include the parameter necessary to function in a current Air Traffic Management.*

Key words: *ATFCM = Air Traffic Flow and Capacity Management, ATM = Air Traffic Management, MAS = Multi Agent System*

Introduction

This paper researches application of intelligent models for assisting decisions based on a multi-agent system for the air traffic management flow and capacity. The designed system consists of software agents which are implemented in the NetLogo (Wilensky, 2018) framework to identify, resolve conflicts and to negotiate agreements between aircrafts regarding separation.

In Europe and USA the idea of breaking down the air ways and replacing them with 4D trajectory is gaining support, that been said the model aims at improving ATFCM and will help by providing insights into congested areas, and ways in which to help deal with them. The proposed model increases productivity by having a greater capacity then the currents system without sacrificing safety. Updating the current ATFCM is challenging because of many constriction on national and international standards regarding safety.

Simulating using MAS

The agent term has been used with several meanings, from a command line to an adaptive, intelligent, autonomous entity (D'Inverno, Luck, & Luck, 2004), in this paper we will use (Srinivasan & Jain, 2010) definition as an interactive and autonomous entity. From a historical point of view, the creation of agents has the goal on modeling intelligent agents to achieve a degree of autonomy.

Recently the research has applied simulations of several agents that can interact with one another. Multi-agent systems have two requirements: building autonomous entities with interactive agents and testing how the system behaves as a result of common actions and interference between agents. The simulations are carried out on a large scale of social sectors such as telecommunications, industrial and military.

The proposed model is concentrated on specific aspects of the system regarding its behavior needs on one hand and on the other hand in forming an agent based simulation. Exact prediction of the behavior at a high level is necessary to model aspect at the very low level of its structure. Additionally taking into account our unique accent on air traffic models, we can assess that a rich environment which defines the physical aspects of the agent behavior is needed to help in establishing the inner-mechanism between agents.

Another model of MAS has concentrated on closed systems, in which most aspects of agents can be determined (Bisantz & Burns, 2016). Closed systems have a number of uses, such as teamwork, dedicated applications and distributed sensor networks where the role of agents is to standardize with the goals of the system. These simulation uses models of complex and heterogeneous agents that can perform different roles and functions.

Multi-agent systems with different capabilities and desires, beliefs, co-ordination and collaboration between them are needed. Coordination refers to the long-term management of events, tasks and actions between agents. Collaboration also needs agents to have the same goals and intentions (Lomuscio, Nepal, Patrizi, Benatallah, & Brandić, 2013). For multi-agent systems communication is made by establishing common schemes, those agents with cognitive abilities being forced to divide the tasks. An example of organizational structures used to distribute roles and tasks could be subject to agents as an inherent coordination mechanism.

Modeling used in cognitive engineering such as the ATM system shows us the following characteristics, this makes them desirable in agent-based simulations:

1. Involve in a variety of roles a number of agents with a variety of intentions;
2. Targeting precise goals or objectives;
3. Having pre-established knowledge, culture, and process;
4. Capable of affecting and being affected by the operating environment.

The first character can identify the air traffic management system as an open agent-based system. Agents work to simulate system requirements, using a heterogeneous set they assign their roles and variables that are precisely captured.

The second characteristic of the air traffic management system shows us that their programmers want to mimic "micro-level" behavior in order to achieve some higher-level "macro-level" goals, as specified in the procedures for air traffic controllers and pilots that will make good air traffic flow patterns. In particular, methods for simulating focus on macro and micro behaviors simultaneously.

The third feature reflects the air traffic simulation configurations that need to be introduced into the models underlying the simulation. In the case of air traffic simulation, the agents and the environment are presented in simulation using the same models as the role of agents that is characterized by: finding agents and their environment, and exposing roles, procedures, tasks and capabilities. This type of representation need a level of effort proportional to implementation in real systems.

The last feature copies its recent focus to viewing the agents' environment. The emphasis on an environmental model facilitates richer models of agents for whom cognitive status, cognitive distribution and expert environmental adjustment can be explicitly described. In the organizational concept many attributes of the environment are created as being divided between agents. The agent-

based simulation shows regulatory, organizational environmental elements that offers a fabric in which agents can be implemented to help with the system's complete behavior.

Discussion and conclusions

NetLogo version 6.0.2 is a programming language for agent-based creation and integration into a virtual environment it helps create emerging behavior and comes with a preexisting database that helps modeling in various fields such as economics, biology, physics, chemistry, psychology, dynamic systems. It allows the exploration of patterns through modifiers such as buttons, levers, imputations, and other interface elements. Beyond exporting, NetLogo allows creating new models and modifying existing ones. NetLogo is an open source software that can be downloaded for free. It is used in a multitude of educational contexts. (Wilensky, 2018)

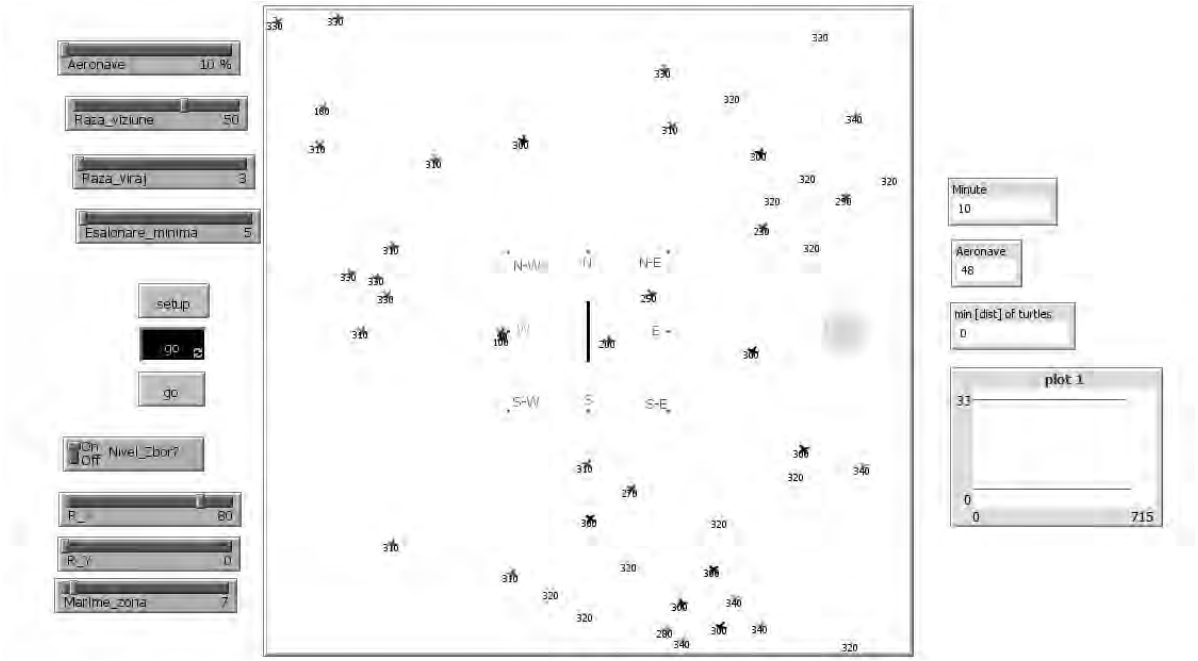

Figure 1: Interface for the Simulator

The simulated model is an area of 200 X 200 nautical miles, with altitudes between flight level 110 and flight level 450, with aircraft speeds between 0.7 Mach and 0.9 Mach using a cap of 50 aircraft and using the following parameters for the agent named aircraft:

1. Degree of roll: 1, 2, 3, 4, 5, 6 degrees;
2. Vision range: 40, 50, 60 nautical miles;
3. Vertical speed: 0.6, 1.3, 2, 2.6, 3.3, 4 * 1000 feet/minutes.

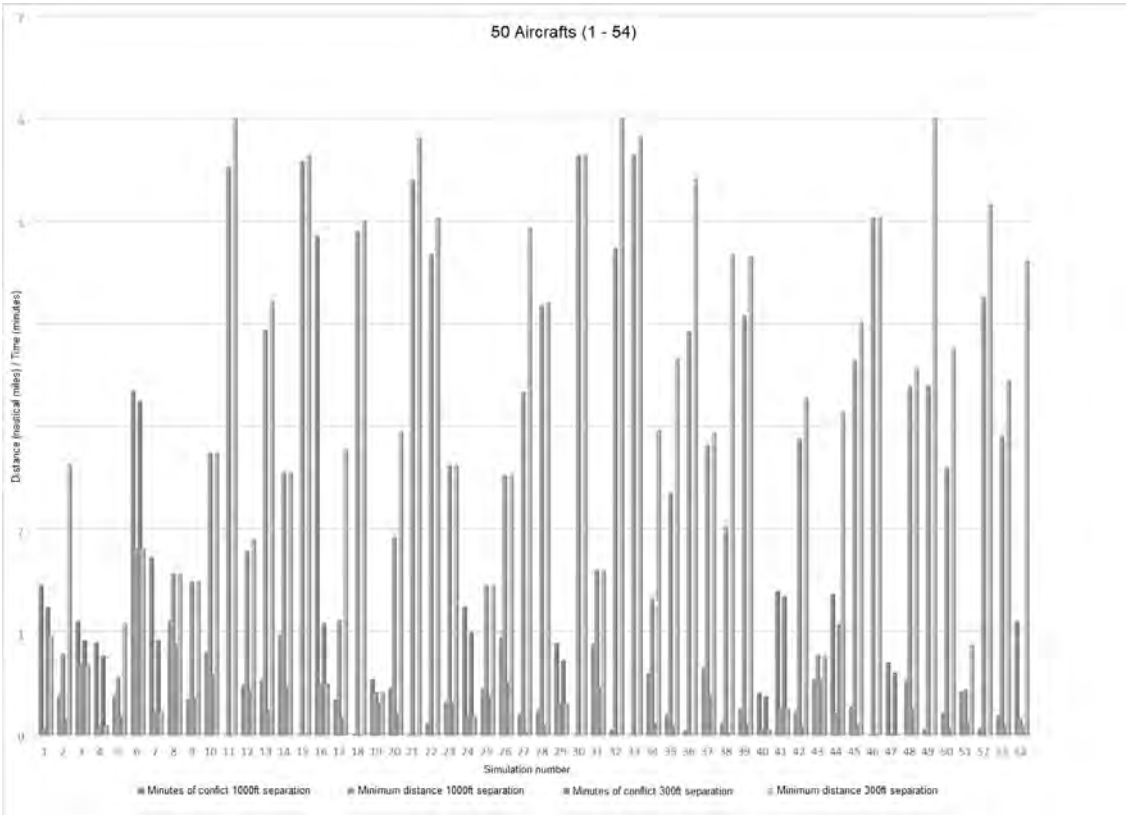

Figure 2: Simulation results 1 to 54

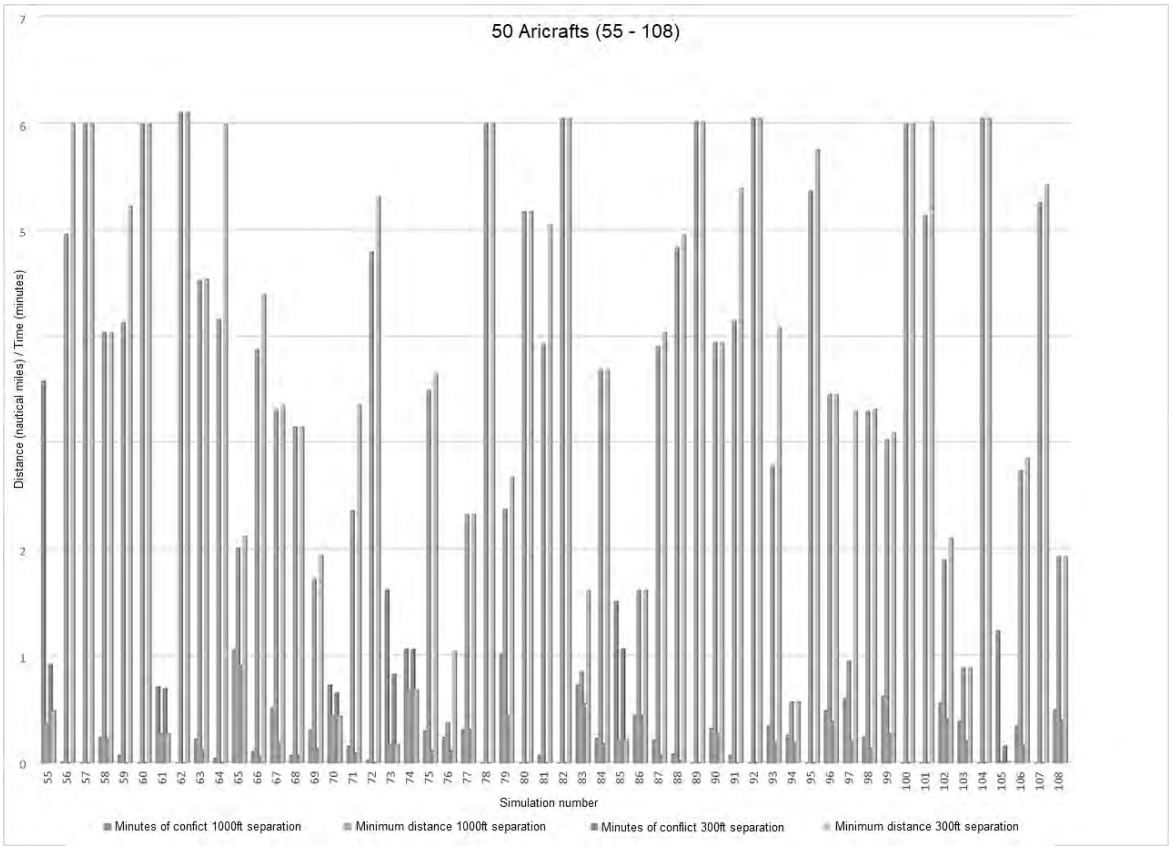

Figure 2: Simulation results 55 to 108

The combination of this parameters results in 108 simulation with 3 hours simulation runtime each, we will use as an indicator the maintaining of the minimum separation between aircrafts horizontally 5 nautical miles and vertically 1000ft.

The proposed model has reached the desired behavior, and we can also see in figure 2 and 3 that if 50 aircraft have 20 simulation out of 108 combinations that ensure the minimum separation distance. It is also noteworthy that the parameters required to maintain minimum separation are found in the table below.

Table 1: Parameters of the simulation in which the minimum separation was achieved

Simulation number	11	15	21	30	33	46	56	60	62	78	80	82	88	89	92	95	100	101	104	107
Vision range	40	40	40	40	40	50	50	50	50	60	60	60	60	60	60	60	60	60	60	60
Degree of roll	2	3	4	5	6	2	4	4	5	1	2	2	3	3	4	4	5	5	6	6
Vertical speed	3.3	2	2	4	2	2.6	1.3	4	1.3	4	1.3	2.6	2.6	3.3	1.3	3.3	2.6	3.3	1.3	3.3

The system was designed to deconfict 2 or 3 aircraft at the same time, we can conclude that the model provides sufficient security to maintain 50 or fewer aircraft with simulated conditions in the area of responsibility over this number due to the complexity of the negotiation between agents is insufficient, resulting in conflicts of more than 3 aircraft requiring updates to the basic mode of operation of the system.

The 50-aircraft simulation can average 3000 aircraft / 24h on average, if we were to simulate the full range of flight levels it would reach 6,000 aircraft / 24h, as a comparison, the average traffic over Romania is about 2400 aircraft / 24h.

References

Bisantz, A. M., & Burns, C. M.
2016
"Applications of Cognitive Work Analysis." CRC Press.
D'Inverno, M., Luck, M., & Luck, M. M.
2004
"Understanding Agent Systems." Springer Science & Business Media.
Kowalczyk, R.
2009
"Computational Collective Intelligence. Semantic Web, Social Networks and Multiagent Systems." *First International Conference.* Wroclaw,: ICCCI.
Lomuscio, A., Nepal, S., Patrizi, F., Benatallah, B., & Brandić, I.
2013
"Service-Oriented Computing"--ICSOC 2013. Berlin: Springer International Publishig Switzerland.
Srinivasan, D., & Jain, L. C.
2010
"Innovations în Multi-Agent Systems and Application – 1." Springer Science & Business Media.
Wilensky, U.
2018, 01 15
NetLogo, 6.0.2. (Center for Connected Learning and Computer-Based Modeling) Retrieved from NetLogo: http://ccl.northwestern.edu/netlogo/

A CRITICAL ANALISYS REGARDING MODELING AND SIMULATING THE FUTURE AIR TRAFFIC FLOW AND CAPACITY MANAGEMENT PROBLEMS. PART 2: AIRPORT CHALLENGES

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Abstract

Purpose *– Simulation using multi-agents system are a new method for the analysis of Air Traffic Flow and Capacity Management, they are based on aspects regarding the Air Traffic Management system which can be directly observed or specified, to help in development of the inner mechanism of the agents.*

Methodology/approach *- The Multi Agent System method may answer many questions regarding the systems that it researches.*

Findings *– Emerging behaviors seem to be most relevant when a system can be judged responsible for the product of the agent's autonomous actions and interactions.*

Research limitations/implications *– The model does not take into account weather, or restriction regarding the airspace users.*

Practical implications *– If we were to simulate a current air traffic system with regard of procedures all agents would imitates current practices.*

Originality/value *– The main issue addressed in the paper is the improvement of airport capacity without affecting its safety using multi-agent systems simulated and design in the NetLogo framework.*

Key words: *ATFCM = Air Traffic Flow and Capacity Management, ATM = Air Traffic Management, MAS = Multi Agent System*

Introduction

Fourteen million flights are expected in Europe by 2035, for this reason it is essential to improve the performance of the ATM. Working throw the experience of Singe European Sky ATM Research 1 (SEASAR1), SESAR 2020 will put the aircraft at the center of the European ATM, this will be obtained throw the integration of airports, air traffic control, air operations systems of airlines and military command centers.

The Next Generation (NextGen) is the name given to the new national aerospace system that will be deployed across the United States of America territory between 2012 and 2025 (Fact Sheet: NextGen. Federal Aviation Authority, 2007). NextGen proposes to transform the US air traffic system from an old ground-based system into a satellite-based system. GPS can be used to save time, reduce air traffic delays, increase air traffic capacity, and allow the monitor with a higher safety margin (Impacts of the LightSquared Network on Federal Science Activities, Testimony of The Honorable Peter H. Appel, U.S. House of Representatives Committee on Science, Space and Technology, 2011). Aircraft will be allowed to fly closer, use more direct routes and avoid delays due to airport overcrowding. To implement them, the Federal Aviation Administration will undergo a widespread transformation of the entire US air transport system. This transformation is intended to reduce bottlenecks in air traffic, from the sky as well as from the airport.

Simulating with MAS

An agent is defined as an entity with some autonomy in acting individually as well as requiring to interact with regard of other agents in the environment (Yager, Abbasov, Reformat, & Shahbazova, 2012).

With this guidance selecting entities that should be modeled as agents are not always well defined. Psychic entities cannot be shaped into agents or agents cannot be defined around functional attributes or tasks (Demazeau, Decker, Pérez, & Prieta, 2015). Each agent can represent the behavior of a man in the environment, or different agents could solve different tasks involving more people. For example, each traffic controller could be seen as an agent, or teams of controllers performing a function can be seen as an agent, or several controllers can be modeled with a monitoring agent, a conflict resolution agent, and so on. The latest agent selection is a design decision imported into the development of simulations and requires the fidelity of each agent's behavior.

Human performance modeling is a common basis for agent modeling in agent-based simulation of integrated human systems. Research communities have added a variety of such models: artificial intelligence and intelligent systems communities in computer science; computational organizational community theory and community model of human performance in cognitive sciences and human factor.

Cognitive models acceptable for agent-based simulations grow in detail and are capable of capturing relevant aspects of human performance where human characteristics based on empirical research are incorporated into a software structure to mimic the human operator (Duffy, 2016). These types of models are seen as performance modeling rather than goal-driven behavior - the current model is based on capturing human actions as understood by the psychological phenomenon rather than a detailed model of all human-driven behaviors.

Simple models of forms regarding human performance can use engineering models to reproduce identifiable tasks. For example in (Vasilakos, Beraldi, Friedman, & Mamei, 2009) modeled air traffic control by using navigation filters to predict if aircraft would lose separation safety and to determine the speed needed to fix such conflicts.

To create intelligent infrastructure, most traditional systems and decision systems require them to integrate SMA. An SMA can be considered as a developing system for each self-employed agent. Like the population dynamics model, each agent in a multi-agent system, theoretically, can operate independently of other agents.

The theory of multi-agent systems has evolved from the desire to create intelligent systems. Within the multi-agent system, for a full specification, it is necessary to characterize the internal information and skills of the agents as well as the interactions between agents with whom they co-exist.

In a multi-agent system, the agent's plan can be defined as a target to be achieved when a group of actions is reached. The skill of an agent is the ability or possibility to perform a set of actions, simultaneously with intelligence towards the results obtained. The multi-agent system is a split system that consists of a group of independent agents who collaborate in a common environment possessing, drive capabilities, knowledge and goals.

Agents are active entities that act in an environment or space, over some passive entities that can be created, destroyed, or modified by other active agency agents, based on the overall relationships that merge objects.

As an example, agent-based simulations can see whether the system will work the way it should when all participants act just as instructed by organizational procedures, regulations and structures, and highlight the areas where flexibility and creativity of individuals is still needed for operating the system. Another example would be when a "free flight" simulation would highlight when pilots would be tempted to force the environment to a degree not exactly desirable in terms of traffic in general. This method illustrates some general questions whose response may be the subject of further discussion such as the urgent need to implement new air traffic management systems.

Even a few examples given here highlight the prospect of agent-based simulations that can be theoretically predicted at any level of detail without any other method - for example, a change in the air

traffic template by implementing a new arrival and decision-making procedure. This is especially relevant when complexity and insecurity between systems that prevents the agent from becoming aware of his impact on local behavior on the performance of the system in general.

SMA modeling and conclusions

Modeling the aircraft and airport agents:

a. Aircraft agent

This is a temporary agent that is created once the aircraft has taken off and clears once the aircraft has landed successfully. Its main purpose is to monitor the main features of the aircraft (aircraft type, category, fuel, weight, heading, speed, route, etc.), forwarding them to the other interested agents. This agent also has the main purpose of detecting a possible conflict with another aircraft within a radius of 30-60 nautical miles.

b. Airport agent

This agent is responsible for departures and arrivals at the airport, he schedules the points and the time of arrival for each aircraft so that the landing flow of the airport is constant, it communicates to the landing aircraft the time and exact point to which they must either to avoid waiting areas. Aircraft can accept this point and time or can refuse it by requesting another, reaching the transfer point at the requested time is done through speed adjustments.

Input data: Flight Plan, Extended Mode S (EHS), Automatic dependent surveillance – broadcast (ADS-B) as well as an estimate of the estimated time of overflight at the point of entry into terminal area T.

Outbound data: Order of all aircraft wishing to cross the terminal area for landing, if there are conflicts over aircraft flying over the same point under a range of 60 seconds then transmits to aircraft agent the new expected overflight time.

Required data:

Calculating the distance between 2 points on the surface of the globe:

1. **D** = 2*R*arcsin ($\sqrt{sin^2(\frac{Lat2-Lat1}{2} + cos(Lat2) * cos(Lat1) * sin^2(\frac{Lon2-Lon1}{2}))}$

Where:

R = the radius of the earth.

Lat1 Lon 1 = Aircraft Coordinates.

Lat2 Lon 2 = Transfer point Coordinates.

2. **T** = D / (GR SPD / 3600) is the estimated overfill time of the transfer point.
3. **List** = The orderly T list of aircraft delivering T to the airport arrival agent.
4. **Poz** = position of the aircraft in the List.
5. **Ta** = time delivered to the aircraft agent by the airport agent [seconds].

Pseudo-code basic solution:

If (**D** <= 100NM)

If (**T** of [**Poz**] - **T** of [**Poz** - 1] <= 60s)

Then (**Ta** of [**Poz**] = T of [**Pos**] + 60s)

Sets (**GR SPD** of [**Poz**] = D / Ta)

If (**GR SPD** <**GR SPD** (minimum accepted))

Then (Procedure (Wait))

The example above illustrates a possible software solution applied by both the airport agent and the aircraft agent negotiating the flight, the airport agent centralizes all the **T**-data of all aircrafts and generates a **List** with the overflow order of the transfer point to the area terminal, if it observes that 2 or more aircraft have **T** in the 60 seconds using the **List** will transmit their new **Ta**, the aircraft agent will compare **TA** with **T** and decide if it will reduce / increase the speed so that **T** = **Ta** or if it is necessary for the aircraft to make a Procedure (Wait).

Modeling using NetLogo (Wilensky, 2018)

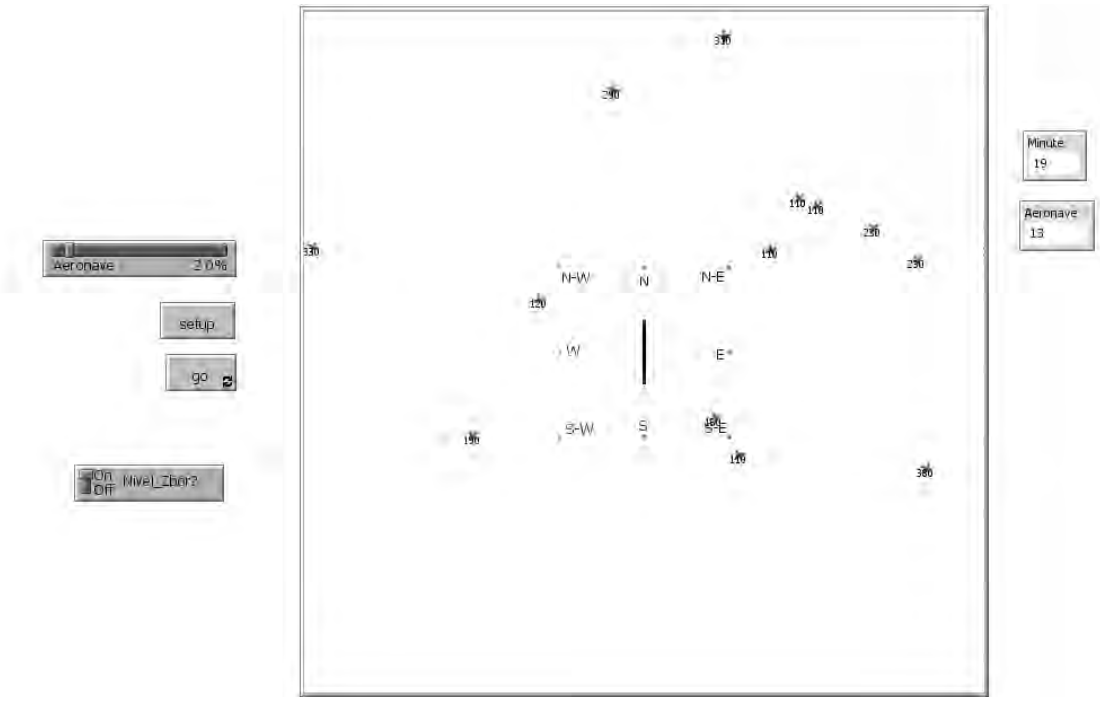

Figure 1: Interface for the Simulator

For traffic smoothing, 4 points (N-W, N-E, S-W, S-E) landing transfer points were used.

Four transfer points (N, S, E, W) were used to simulate traffic that departs from the airport.

Two types of species, landing aircraft, and take-off aircraft were used to model this agent.

In the modeling of the departing aircraft (blue color), the agent is randomly created at one transfer point, and the XOY coordinates, altitude and speed to the edge of the area of responsibility are assigned.

In modeling the landing aircraft (purple color), the agent is randomly created at the edge of the responsibility area, depending on the location of the aircraft being assigned a transfer point. According to the transfer point and current speed it is assigned a landing order number, the aircraft operator adjusts its speed and height to reach the transfer point according to the communicated position.

In the simulation, there was a limitation on the number of landings possible, for the current simulation the capacity of an airport has not exceeded a 60 second run for each transfer point thus validating the model

References

Demazeau, Y., Decker, K. S., Pérez, J. B., & Prieta, F. d.
2015
“Advances în Practical Applications of Agents, Multi-Agent Systems, and Sustainability: The PAAMS Collection.” *13th International Conference, PAAMS.* Salamanca.
Duffy, V. G.
2016
“Advances în Applied Digital Human Modeling and Simulation.” *Proceedings of the AHFE 2016 International Conference on Digital Human Modeling and Simulation.* Florida: Walt Disney World.
Vasilakos, A. V., Beraldi, R., Friedman, R., & Mamei, M.
2009
“Autonomic Computing and Communications Systems.” *Third International ICST Conference, Autonomics.* Limassol.
Wilensky, U.
2018
NetLogo, 6.0.2. (Center for Connected Learning and Computer-Based Modeling) Retrieved from NetLogo: http://ccl.northwestern.edu/netlogo/
Yager, R. R., Abbasov, A. M., Reformat, M. Z., & Shahbazova, S. N.
2012
Soft Computing: State of the Art Theory and Novel Applications. Springer.

2007
Fact Sheet: NextGen. Federal Aviation Authority.

2011
Impacts of the LightSquared Network on Federal Science Activities, Testimony of The Honorable Peter H. Appel, U.S. House of Representatives Committee on Science, Space and Technology.

APPLYING A PERFORMANCE MANAGEMENT BY ELIMINATING A POST BLOCKER

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Abstract

Purpose *– The present paper aims to present an existing situation within a manufacturing company - more precisely in one of its production units - where a problem related to the efficiency of the production process arose.*

Methodology/approach *- The scientific methods used to find the solution to the identified problem, fall within the field of study dedicated to optimizing the production activities, to be achieved in a production stream and in the overall improvement of a job.*

Findings *– Based on the timeframe calculation of a product before and after the implementation of the proposed solution, it was possible to monitor the thread guiding system that contributes to the assembly of the finished product and the implementation of the improved variant.*

Research limitations/implications *– Performance management is once again essential for the relationship between managers, employees, and the production process. These methods mainly aim at achieving a high efficiency of the operators' work so that their activities can be carried out under normal working conditions.*

Practical implications *– The solutions found helped to improve the production process so that the product was designed to meet the customer's requirements and needs, and assembled in a shorter time and at a lower cost.*

Originality/value *– Eliminating the problem identified in the production flow was achieved by managing good performance. This has led to the use of a performance management system, in which, by optimizing production, employees have increased their chances of achieving their own goals at the same time as the company.*

Key words: *post blocker, production flow, timing, performance management*

Introduction

An interesting and extremely exciting problem that has been put in recent years is the emphasis that must be placed either on performance management or on performance management (Cappelli, Tavis, 2016).

To solve this dilemma, many specialists have written studies and have published a number of valuable works that try to tilt the balance either way or the other (Buckingham, Goodal, 2015).

Thus, it can be said that there are currently significant new trends in how companies manage performance, but also in the management practices they use in trying to improve this performance (Kinley, 2016).

Measuring working time by timing workstations

Measurement of work by timing of the use of working time is the most used method for measuring the duration of manual activities, especially those that are repeatedly executed to achieve a unit of product

(Johanson, 2010). This method is carried out in three stages, namely: preparing, performing and processing the results of the timing.

Stage 1: Preparing the timing requires 5 steps (Del Fabbro, Santarossa, 2016):

Step 1.1. Observer training: the observer enters the atmosphere of the workplace and is directly informed of the work process and the organization of the workplace.

Step 1.2. Decomposition of work into work: delimit the activities (or their subdivisions). Technological time (machine operation) is differentiated from manual time overlapped by operator's unmanaged time. Manual activities are separated by working time categories: operational time, serving time.

Step 1.3. Determine the time of observation by timing: specify the periods in which the timings will be performed.

Step 1.4. Selecting the operator: important step, as the results of timing depend directly on the skills and qualification of the operator. It introduces the notion of working rhythm, which refers to how to perform a task, faster or slower, depending on the work skills and the level of effort of the operator. Otherwise, the selected operator must be the one who performs the workload as close to average as possible, and has an average work rate.

Stage 2: Timing is done in 3 steps:

Step 2.1. Recording the information about the study: follows the registration on a standard form of the information, which is grouped into: general information (workplace, selected operator); information on how to perform the work process (organization of the workplace); data recorded during timing; synthesis information (results from data processing).

Step 2.2. Determine the number of timings: this number is inversely proportional to the size of the timed duration, as follows: if the lengths of the work items are high, the number of timings will be small; if the lengths of the work items are small, the number of timings will be high.

Step 2.3. Timing itself: Record the times associated with the work items in which the operation was decomposed and record them on the standard form.

Stage 3: Processing the timing results takes place in 4 steps:

Step 3.1. Analyze the recorded data: remove from the string of values associated with process sequences those who have unnatural causes of the process.

Step 3.2. Calculate the normed time for each item of work: Apply a calculation procedure the purpose of which is the value of the standard time for each element of the process.

Step 3.3. Establish additional time: Due to the fact that the operator can not work without interruption (due to factors such as fatigue, natural necessities, unavoidable delays), it is necessary to take into account additional time when calculating the time limit (standard time).

Step 3.4. Calculate the Time Rule (Standard Time).

Timing and blocking post identification

For reference no. 1 5 consecutive timings for each station are made. The time taken by each individual post is shown in Table 1. The time cycle diagram is also shown - Figure 1.

From the time cycle diagram, information is obtained about: the line on which the timing was made - namely line 1, team A1, within project X1, at reference no. 1. Thus, in the Avergaje column, the average of the time in each station is passed, and in the Minium column the minimum values for each post are exceeded. This chart shows the number of wiring that the operator must perform, the number of shifts, the duration of the actual work time and the length of the breaks. The diagram shows that the obstacle (blocker) is the station 1 because it has a maximum time of 90 seconds.

Table 1 Timing of stations analyzed for reference no. 1

Post 1				Post 2				Post 3				Post 4				Post 5				Post 6			
nr	min	sec	sec total	nr	min	sec	sec total	nr	min	sec	sec total	nr	min	sec	sec total	nr	min	sec	sec total	nr	min	sec	sec total
1	1	32	92	1	1	11	71	1	1	12	72	1	1	6	66	1	1	10	70	1	1	10	70
2	1	29	89	2	1	10	70	2	1	10	70	2	1	7	67	2	1	9	69	2	1	9	69
3	1	28	88	3	1	9	69	3	1	12	72	3	1	5	65	3	1	10	70	3	1	10	70
4	1	32	92	4	1	10	70	4	1	11	71	4	1	6	66	4	1	8	68	4	1	11	71
5	1	30	90	5	1	11	71	5	1	12	72	5	1	8	68	5	1	9	69	5	1	9	69
		min	88			min	69			min	70			min	65			min	68			min	69
		aver.	90			aver.	70			aver.	71			aver.	66			aver.	69			aver.	70

Post 7				PTA				CE				COND											
nr	min	sec	sec total	nr	min	sec	sec total	nr	min	sec	sec total	nr	min	sec	sec total	nr	min	sec	sec total	nr	min	sec	sec total
1	1	9	69	1	1	2	62	1	0	43	43	1	0	58	58	1			0	1			0
2	1	8	68	2	1	0	60	2	0	41	41	2	0	59	59	2			0	2			0
3	1	10	70	3	1	2	62	3	0	43	43	3	0	57	57	3			0	3			0
4	1	9	69	4	1	1	61	4	0	42	42	4	0	58	58	4			0	4			0
5	1	9	69	5	1	0	60	5	0	43	43	5	0	58	58	5			0	5			0
		min	68			min	60			min	41			min	57			min	0			min	0
		aver.	69			aver.	61			aver.	42			aver.	58			aver.	0			aver.	0

CYCLE TIME DIAGRAM

Line :
Product :
Reference : 576

Site: BASCOV

Measurements of 5 cycles

	Operators	Average (s)	Minimum (s)	Variability (average-mini) / mi
1	Post 1	90	88	3%
2	Post 2	70	69	2%
3	Post 3	71	70	2%
4	Post 4	66	65	2%
5	Post 5	69	68	2%
6	Post 6	70	69	1%
7	Post 7	69	68	1%
8	PTA	61	60	2%
9	CE	42	41	3%
10	COND	58	57	2%
11	0	0	0	#DIV/0!
12	0	0	0	#DIV/0!
13	0	0	0	#DIV/0!
14	0	0	0	#DIV/0!
15	0	0	0	#DIV/0!
16	0	0	0	#DIV/0!
17	0	0	0	#DIV/0!
18	0	0	0	#DIV/0!
19	0	0	0	#DIV/0!
20	0	0	0	#DIV/0!
21	0	0	0	#DIV/0!
22	0	0	0	#DIV/0!
23	0	0	0	#DIV/0!
24	0	0	0	#DIV/0!
25	0	0	0	#DIV/0!
26	0	0	0	#DIV/0!
27	0	0	0	#DIV/0!
28	0	0	0	#DIV/0!
29	0	0	0	#DIV/0!
30	0	0	0	#DIV/0!
31	0	0	0	#DIV/0!
	Total	668	655	2%
	Unbalance inter-workstation savings			26%
	Workstation variability savings			2%
	Total savings (operators in motion)			27%

Customer demande / day :	800
Nomber of shifts :	2
Daily demand per shi :	400
clean up :	5
5 minutes meeting :	5
brakes :	20
Opening Time (min) :	480
total change over time :	
miscellaneous :	
Production Time (min) :	450

Takt Time (s) 67.50

(Operational Standard Time) OST = suma min/60

OST = 10.9166667

Actual number of operators :

(Total mini / Takt Time) = **Target number of operators: 9.7**

Commentaires:

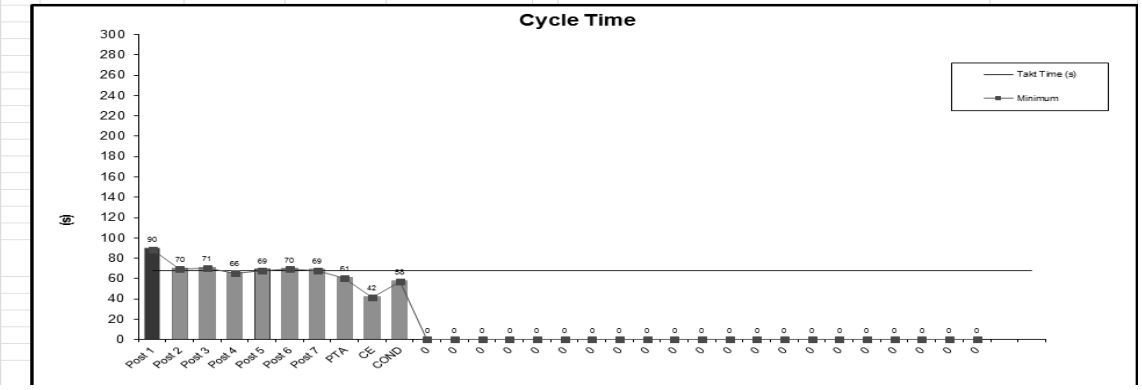


Figure 1. Timing diagram of the analyzed positions for reference no. 1

Next, 5 successive timings are made and for reference no. 2 for each post. The time taken by each individual post is shown in Table 2. The time cycle diagram is also shown - Figure 2.

Table 2 Timing of stations analyzed for reference no. 2

Post 1				Post 2				Post 3				Post 4				Post 5				Post 6			
nr	min	sec	sec total	nr	min	sec	sec total	nr	min	sec	sec total	nr	min	sec	sec total	nr	min	sec	sec total	nr	min	sec	sec total
1	1	23	83	1	0	56	56	1	0	59	59	1	0	54	54	1	0	56	56	1	0	56	56
2	1	21	81	2	0	58	58	2	0	58	58	2	0	53	53	2	0	55	55	2	0	57	57
3	1	23	83	3	0	54	54	3	0	59	59	3	0	54	54	3	0	56	56	3	0	58	58
4	1	22	82	4	0	54	54	4	0	59	59	4	0	53	53	4	0	55	55	4	0	57	57
5	1	24	84	5	0	56	56	5	0	58	58	5	0	53	53	5	0	56	56	5	0	56	56
		min	81			min	54			min	58			min	53			min	55			min	56
		aver.	83			aver.	56			aver.	59			aver.	53			aver.	56			aver.	57

Post 7				PTA				CE				COND											
nr	min	sec	sec total	nr	min	sec	sec total	nr	min	sec	sec total	nr	min	sec	sec total	nr	min	sec	sec total	nr	min	sec	sec total
1	0	57	57	1	0	54	54	1	0	58	58	1	0	53	53	1			0	1			0
2	0	58	58	2	0	59	59	2	0	56	56	2	0	55	55	2			0	2			0
3	0	57	57	3	0	54	54	3	0	58	58	3	0	53	53	3			0	3			0
4	0	56	56	4	0	56	56	4	0	56	56	4	0	54	54	4			0	4			0
5	0	57	57	5	0	58	58	5	0	56	56	5	0	53	53	5			0	5			0
		min	56			min	54			min	56			min	53			min	0			min	0
		aver.	57			aver.	56			aver.	57			aver.	54			aver.	0			aver.	0

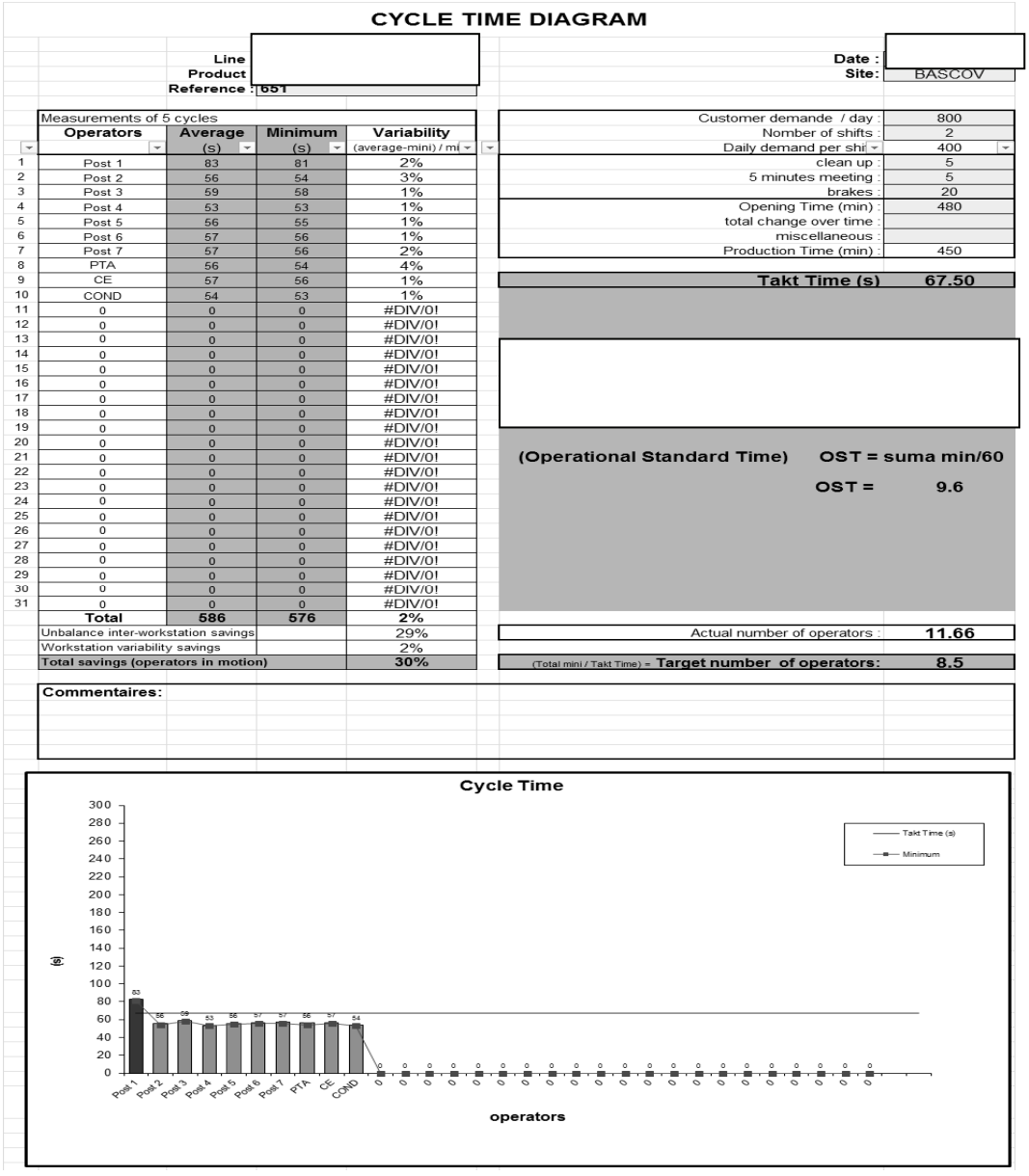


Figure 2. Timing diagram of the analyzed positions for reference no. 2

From the time cycle diagram, information is obtained about: the line on which the timing was made - namely line 1, team A2, within Project X1, reference no. 2. Thus, in the Avergaje column the average of the time in each post is passed, and in the Minium column the minimum values for each post are exceeded. This chart shows the number of wiring that the operator must perform, the number of shifts, the duration of the actual work time and the length of the breaks. The diagram shows that the obstacle (blocker) is the station 1 because it has a maximum time of 83 seconds.

Presentation of tack time blocking post

The blocker (obstacle) is the post that stops the assembly line because the post is too loaded and the operator is not holding the tape.

The blocking station is 1, because it is the post that has the longest running time (90 seconds) that exceeds the clock's time and is 69 seconds. So the station 1 gives the tact-time of the line. Takt-time is the frequency with which a semifabrike moves from one station to another. The calculation of the tact-time is made by the formula (1).

$$Takt - time = \frac{(effective\ time * 60) * day}{no\ wiring} - working\ time\ of\ the\ workbench \quad (1)$$

The efficiency for this situation refers to the degree of utilization of the wiring time to suit the number of wiring and the number of people. Efficiency is calculated using formula (2).

$$Efficiency = \frac{total\ assenbly\ time * \frac{no\ wiring}{day}}{\frac{no\ workers}{work\ line} * 450min.} \quad (2)$$

The direct operational staff consists of: operators, team leader, reserve and retouch. For the calculation of efficiency, two situations are considered, namely:

- phase 1 when taking into account the people undergoing training (new pledges), who pass 2 days of theoretical training, 3 days of practical training and 5 days in the post with the trainer next to them.
- phase 2 when people undergoing training are dropped.

The takt - time of the Volet lines is shown in Table 3.

Table 3 Takt time Volet lines

REF.	TIME AS (MIN)	KOSU	NR operatori.	K	NR. CAB.	CAB	TAKT T	EFIC.
228576 05	20.456	13	11.33	1.12	47	350	69.39	140%
228585 05	20.267	13	11.33	1.11	47	353	68.72	140%
4524651 10	18.279	13	10.00	1.00	52	392	61.31	141%
4524652 10	18.090	13	10,00	0.99	53	396	60.64	141%

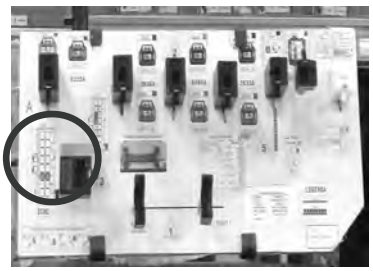
Implementing a wire guidance system to eliminate losses

The Guidance system will be implemented in the 1st block - blocking station, to eliminate defects and to increase efficiency.

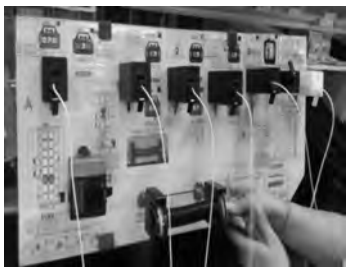
This system indicates - by a single touch of the terminal - the cavity (the cell) into which the thread is to be inserted - and is shown in Figure 3 - with steps a, b, c.

The same is repeated for other references.

Thus, all threads inserted in the IC72 connector are linked to this guidance system.



3.a. Guiding system of wires



3.b. Terminal insertion into top and bottom connectors crossing wires through bellows

3.c. Touch the terminal on the metal side and it illuminates the cell

Figure 3. Using the Wire Guidance System

Results achieved after implementation of guidance system for wires

We will calculate T - the time of realization of a wiring before the implementation of the guidance system and after it is implemented. This indicator T is calculated using formula (3).

$$T = \frac{t_{max} * no\ workers * k}{60} \qquad (3)$$

Where:

t_{max} – maximum time carried out by an operator

nr. op – number of operators,

Before implementation of the guidance system, the realization time of a wiring is marked with T_0.

Tack-time work band = 69,39 (sec)

Replace in formula (3) the input data - from table 2 and 3:

t_{max} = 90 (min)

nr. op. = 11.33

k = 1.12

there is obtained:

$$T_0 = \frac{90 * 11{,}33 * 1{,}12}{60} \qquad (4)$$

T_0 = 15,17 (min) / wiring

Performance Efficiency = 140% .

Number of defects caused by workstation 1 = 25 / week

After implementing the wire guidance system, time to achieve of a wiring is noticed with T_1.

Tack-time work band = 61.31 (sec)

Replace now in formula (3) the input data - from table 2 and 3:

t_{max} = 83 (min)

nr. op. = 10.00

k = 0.99

there is obtained:

$$T_1 = \frac{83 * 10{,}00 * 0{,}99}{60} \qquad (5)$$

T_1 = 13,97 (min) / wiring

Performance Efficiency = 141% .

Number of defects caused by workstation 1 = 1 / 2 weeks

Discussions and conclusions

Through the found solution that consisted in the implementation of a thread guide system, an improvement in the production process was found. The elimination of the problem identified in the production flow has been achieved by managing good performance.

Thus, there is a substantial reduction in the number of defects caused by post-blocker post 1, from 25 / week to 1/2 weeks.

Also, a reduction in the design time of a wiring with Δ = 15.17 - 13.97 = 1.2 (min) / wiring has been achieved. This reduction allowed an increase in the number of wires on a 45 wiring exchange.

All these benefits are the result of applying a performance management system, in which, by optimizing production, employees have increased their chances of achieving their own goals at the same time as the company.

Last but not least, it has to be noted that the product achieved succeeded in satisfying the client's requirements and needs, and its assembling was done in a shorter time and at a lower cost.

References

Buckingham, M., and A. Goodal
2015
“Reinventing Performance Management”. Harvard Business Review. April. 23–37.
Cappelli, P., and A. Tavis
2016
„The performance management revolution”. Harvard Business Review. October. 47–69.
Del Fabbro, E., and D. Santarossa
2016
„Ergonomic Analysis in Manufacturing Process. A Real Time Approach”. Procedia CIRP, Elsevier.
Johanson, D.
2010
„Modified method time measurements for ergonomic planning of production systems in the manufacturing industry”. International Journal of Production Research 38 (17) November: 4051-4059.
Kinley, N.
2016
„The end of performance management: sorting the facts from the hype.” Strategic HR Review. Vol 15, No 2. 84–108.

MODERN COMPUTER GAMES AND THEIR RISK TO TEENAGERS

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Abstract

The media in general and computer games in particular broadcast many violent contents. It is possible to observe explicit or implicit violent content. According to the catharsis theory during normal and routine activities, people and in our case children and teenagers accumulate frustration and may discharge it when they are under stress in violent behavior.

***Purpose** – to examine the risks and dangers to children and teenagers from modern computer games. The complexity of the issue of risk perception in modern society and aggression are concepts that have been researched in the past. However, there are few researches of the changes in these perceptions due to the technological development of the internet, computer games, and the increasing use of it at home, especially by teenagers .It is very important to understand how children and adolescents perceive the dangers of computer games, how this affects their socialization process, since many theories dealing with health risk behaviors claim that the risk perceptions are a main and important component in shaping risk behaviors.*

***Methodology/approach** – case study of dangers children and teenagers in Israel are exposed to using computer games.*

***Findings** – this research findings are a first step to recognize the problem of exposing teenagers to computer games and media with a violent content, supporting more violent and antisocial behavior among them.*

***Research limitations/implications** – not always the victims are ready to admit and ask for help, not always the abusers are ready to admit they violate the rules and get beyond social norms and laws.*

***Practical implications** – the author claims the phenomenon is too serious to neglect, so it should be examined and taken care of.*

***Originality/value** – cases from the field are a clear demonstration of the problem existence.*

***Key words: computer game, teenagers, violence**.*

Introduction

The complexity of the issue of risk perception in modern society and aggression are concepts that have been researched in the past. However, there are few researches of the changes in these perceptions due to the technological development of the internet, computer games, and the increasing use of it at home, especially by teenagers (Sasson et.al., 2011). It is very important to understand how children and adolescents perceive the dangers of computer games, how this affects their socialization process, since many theories dealing with health risk behaviors claim that the risk perceptions are a main and important component in shaping risk behaviors.

Background – computer games

Computer games have changed over the years, and today they includes active operation in computer interfaces. A player takes an active part in the game: he chooses the hero character. The rules in modern games are more complex and the goals change and sometimes more than one goal is required to the hero. The hero must locate his enemies, and he has to choose one action out of several options. The hero's way is more complicated and he moves through a maze. This causes high

level of identification of the player with the hero and the plot. In many games the players are required to build their own world. In such games, the existence of scenes of battles and violence stems only from the player's choice. There are no absolutely bad or good characters, all has character and each one acts to achieve its own goals. Today the games are perfected to the point that by choosing the character, the child can choose to be "the bad guy" (Stamoulis and Farley,2010).

The very idea the game delineate is entering into another character. This possibility is an escape from reality, and players sometimes reach a state of total identification with the character, to the point of neglecting their real lives. In children, the boundaries between fantasy and reality are unclear, so there may be situations in which the game will become a reality to them. Many games that were considered violent several years ago were "neglected" because of the new violent games, in which there was a high graphical development that allow games higher realism. In addition, games that include violent footage also include sound clips of groans, shouts, groans and blows. You can see in detail the damage caused by each injury and you can choose larger and more deadly tools. Besides the positive features games develop, like coordination, hand-eye coordination and learning the new and advanced medium, communication with people through the game, players spend time and money playing games that harm their ability to identify negative emotions and cause them non-social behavior. As a result of it, there is a functional harm in the players' behavior outside the computer world in physical game and cognitive skills, and even the ability to communicate "face to face".

Socialization is a process by which the individual learns his role in society. During the process, the person acquires the main norms and values of the society around him. In addition, in this process, a person is physically shaped through experience in social situations. Who are the socialization agents? Parents and family, frames, friends and the media - in our case violent computer games.

The connection of the media to socialization: Mass media are one of society's socialization agents, from which the individual can learn a lot about society, culture and desired norms. Over the years, the time taken by the media in the individual's life is growing and he is exposed to it in an earlier stage of his life. For example, computer games take large part of the culture of many children in Israel and around the world, as well as in the teenagers' population.

The early stage of socialization: occurs in the first years of life, the ones that shape the person. At this stage there is an intensive process of learning, education and acquiring ways of behaving. Family and especially parents have an important and central role at this stage. The media intervene in the child's socialization process. In their second year of life, babies watch videos, listen to songs, and hear stories read to them. In one of the classic researches in this field (Bandura,1986), children's behaviors were observed after watching a violent movie. In one group of children, a positive reward was given to the person who hit in the movie, and in another group a negative reward was given to the person who hit in the movie. In the observations made after the children watched the movies, it was found that the children who watched violent behavior that got positive reward tended to imitate it when they were kept under observation, whereas children who watched the negative reward did not imitated the violent behavior. The new violent behavior was also observed in follow-up researches after more than six months. In another researched performed by the same researchers group, it was found that the children were also ready to reconstruct the behavior of the punished model after they themselves were rewarded for it.

The stage of adolescent socialization: in adolescence parental authority is undermined, the power of the media increases and it becomes a main socialization agent. Since the adolescent aspires to be independent of his parents the power of the media increases. Many teenagers use a wide range of media on a daily basis, whether it's smartphones, personal computers, television, and even online lessons on schools that use communication technologies for educational purposes. In addition, many of the teenagers play computer games (like Call of Duty and GTA) that contain violent content like curses, physical violence, nudity, women's objectification and more. The teenagers' culture, which is based on the media, their socialization agent, influences their behavior, character and thinking of adolescents. A research that examined the impact of violent video games on teenagers compared two groups, one played violent video games and the other did not. It should be noted that the research examined two equal groups without differences. The research examined violence demonstration in each group and compared the results. The research results clearly showed that the group that played violent video games showed higher level of aggression than the control group that did not play violent video games at all (Sasson et.al., 2011).

What do children learn in early age from the media (in our case from violent computer games)? Children acquire basic knowledge about the external environment and the ability to complete or contradict the information they have got from their parents. Watching and consuming media reduces interaction with the parents. Children can watch and play computer games without parental supervision and guidance and the same games are involved with the problematic areas of reality like violence, sexuality, alcohol and crime etc.

Analyzing researches of correlation between violence and computer games during 20 years, shows that violent computer games can increase aggressive behavior among teenagers, especially boys, and that the games' influence may be expressed immediately or over a longer period of time (Sasson et.al., 2011) for example, one research showed that children who played violent games for less than 10 minutes and then participated a mood test testified they have aggressive characteristics and performed aggressive actions shortly after the game.

Violence in computer games and its influence

The media in general and computer games in particular broadcast many violent contents. It is possible to observe explicit or implicit violent content. According to the catharsis theory during normal and routine activities, people and in our case children and teenagers accumulate frustration and may discharge it when they are under stress in violent behavior. Catharsis is an outlet for frustration and tension through observation of violent behavior of the other. According to this theory, watching violence, in our case children and teenagers, enables them to unload the aggression they accumulated in schools and during the day by watching violent activity in computer games without actually acting violently (Stamoulis and Farley ,2010). Broadcast violence plays a vital role in society by allowing viewers to release their feelings of frustration and anger without being physically involved with violent activity. The term "catharsis" was first phrased in Aristotelian theory, according to which human beings need to release tension. Stress release is generated by emotional expressions formed during any participation in media content. In children, the game is an entry to fantasy and identification with the characters and the moves. Therefore, according to this theory, the more violence the children expose through movies and TV shows, the more they will disarm their aggression in front of the screen and become less violent in everyday life. Since the activity in computer games is not passive but active, the catharsis component becomes more significant; The children's role in the game is not limited only to watching, since they create the event, and therefore express their feelings in every step they take in the game.

Those who opponent the catharsis approach is based on a claim raised about television and movies, but weak regarding to computer games. They claim that as we cannot be satisfied by watching people eat on television (the opposite is true), it is also impossible to release the desire to violence arose watching a movie. However, as noted, children who play computer games go through an active experience and not passive such as watching television.

On the other hand, the theory of stimulation to violence claims that exposure to violent behavior on television and computer games causes the viewers and, in our case, teenagers and children, stimuli that increase excitement and may cause violent outburst. According to this theory, watching violence creates even more severe violence. The more the children are exposed to violence, the more they will feel the need to unload this violence, and even harder, outside the media world, and, in addition, they will get new ideas for increased violence. Thus, for example, we can interpret serious criminal cases.

Cases that took place in Israel during 2015-2017

1. Two teenagers from Jerusalem area got out to have fun, drank some alcohol, and on their way home bumped into a homeless man who slept on the bench in a public park. They asked a cigarette from the homeless, he didn’t have any, so the teenagers decided to beat him with a tree plank they found in the park. They attacked the homeless man who is about 60 years old, seriously hurt him and left in the part till he died. The two teenagers were arrested later and claimed that from their point of view it was a game. The homeless man cursed them and they thought that, like in the computer games, they can hit him and “nothing will happen”. The closer examination revealed that the two of them really liked violent computer games, and their behavior in front of the helpless person was a replication of their games’ behavior. They did not pay attention to the fact the man was bleeding and needed medical help.

2. A boy 15 years old from one of the north villages decided to revenge on other pupil from the same class who did not help him on exam. He wrote a post telling the other boy loves “caressing”. The excellent pupil got disturbed and bothered by other pupils from the class, who laughed at him and humiliated him. From the moment the post was published, he started deteriorating in his school achievements and sometimes preferred not to go to school at all. The parents were informed by the school authorities, the boy was treated by psychologist, changed the school and never got back to it.
3. A 15-years old girl who dated a guy who was 17 years old was taken picture when making sex, without her knowledge. The guy blackmailed her and threatened to publish the movie. The parents and authorities did not know anything about it till the girl decided to commit a suicide. She was rescued and then the story became known. A police investigation found the guy. He didn’t feel any regrets. In his vision, there are lots of similar movies made all the time, so nothing wrong can be found is his actions. His lawyer argued that his client is innocent since he learnt from the internet- a place open to everybody.

It should be remembered that the basic aggression of the players and the interaction between it and environmental factors and human aggression is any behavior directed at another person done in order to harm to him (Anderson and Bushman, 2002). Aggression is commonly divided into two categories: one includes emotional aggression (effective) and hostility, and the second relates to instrumental and purposeful aggression (Berkowitz, 2005). However, some researchers question this (emotional / instrumental) distinction because, in real life, the types of aggression are mixed together, and the intent to harm is a necessary trait in all types of aggression.

Discussion and conclusions

Most researchers now think that arousal affects more children's actual behavior patterns than catharsis. This can be found in the "Reinforcement theory" (Smith, 2010). Descriptions of evil and violence in the media constitute a "breeding ground" for the worldview as a cruel, unreliable, and dangerous place. The more violent media the children experience, the more they will exaggerate in evaluating the levels of violence in real society. The fact that violent games have a permanent end of annihilation, destruction and killing only intensifies feelings of evil. The violent and cruel behavior become more spread in the young generation, maybe because the boundaries between the games and internet media canals and the reality are blurred. This phenomenon is becoming dangerous in Israel and other countries and needs consideration of police, legal authorities, schools, parents and the whole society.

References

Anderson, C. and B. Bushman
2002
“Human aggression.” Annual review of psychology, 53(1), pp 27-51.
Bandura, A.
1986
“Social foundations of thought and action: A social cognitive theory.” Englewood Cliffs, NJ: Prentice Hall.
Berkowitz, A.D.
2005.
“An overview of the social norms approach”, In L.C. Lederman & L.P. Stewart (Eds.), “Changing the culture of college drinking: A socially situated health communication campaign.” Cresskill, NJ: Hampton Press.
Sasson, H., R. Erez and Z. Elgali
2011
“Risks on the web: adolescents’ perceptions and coping mechanisms.”
http://www.knowledgecities.com/KCWS_2011_Proceedings.pdf. 2011
Smith, K.
2010
“Schedules of reinforcement.” Retrieved June 2, 2010, from University of Minnesota Website: http://www.cehd.umn.edu/ceed/publications/tipsheets/preschoolbehaviortipsheets/schedule.pdf
Stamoulis K. and F. Farley
2010
“Conceptual approaches to adolescent online risk-taking.” CyberPsychology.
http://www.cyberpsychology.eu/view.php?cisloclanku=2010050501

THE RELAUNCHING OF FAIRS AND EXHIBITIONS IN THE INDUSTRIAL MARKETING AND ADAPTING TO THE INDUSTRY 4.0.

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Abstract

Purpose *– The main issue analyzed in the present paper is if industrial exhibition industry is moving to Industry 4.0 level and to understand the most important trends and tools which can contribute to the re-launching of industrial fairs and exhibitions.*

Methodology/approach *– direct participation as exhibitor; in-depth professional interviews with organizers, industrial marketing experts and exhibitors; case study and data analyses.*

Findings *– After several years of slow decrease industrial exhibitions try to reinvent and to adapt to Industry 4.0, but they still have long way to reach that level. Slowly but surely digital, innovative solutions are spreading in the industry of exhibition too. The human interface, sustained by integrated digital tools and systems can be the key to success in the future for industrial marketing and industrial exhibitions.*

Research limitations/implications *– this study refers to the existence of the elements of Industry 4.0, general efficiency or return of investments in exhibitions are not analyzed.*

Practical implications *– the study aims to offer concrete directions to develop this field for organizers and for exhibitors, too.*

Key words: *exhibition in Industry 4.0, industrial marketing communication.*

Introduction

One of the most important issues of industrial marketing communication and of sales promotion are fairs and exhibitions, which are called complex marketing systems by dr. Jozsa. “These are important events for not just marketing communication processes, but also from the point of view of product-, price- and sales policy and marketing research”. (Jozsa, 2005). The popularity of exhibitions and fairs are explained by the advantages of these events: the concentration of potential customers, promotion of products and services, immediate feedback, meeting important business partners, training for experts, meeting – observing competition etc. Norman Hart emphasizes a positive aspect of exhibitions: “potential customers pay visits to your stand, and not vice versa, visitors show more perceptiveness, refusal is more difficult” (Hart, 1998). According to the EIF Exhibition Industry Federation, exhibitions are visited mostly (over 80%) by the right persons, meaning the persons that companies with stands waits, persons “included in the profile of “influencer”, from the groups which takes decisions in industrial acquisitions.

The main functions of fairs: increasing of commercial trades, increasing information exchange, motivating visitors, promotion (image promoting and increasing attention towards new products). (Jozsa, 2005), (Torocsik, 1996).

Industrial fairs and exhibitions

Short history of fairs and exhibitions

Exhibitions and fairs (in the beginning general fairs, then industrials events too) have a long history in the developed countries. We have been left inheritance with the first mentions from the Antiquity, in the Holy Bible, The Book of Esther is described the Persian Emperor Ahasuerus. He organized in Susa, the former capitol of the empire, "a great event… to show the great wealth of his kingdom and the shine of his greatness … for more than hundred and eighty days" (Hart, 1998). Without an exhaustive historical review, we have to mention the Great Expositions, lately called the World Expo or Universal Expo, which, starting from 1851, London, wants to be The Great Exhibition of the Works of Industry of All Nations. In Romania, the development of exhibition industry started after 1960, when The Central Pavilion or The Cupola was inaugurated in Bucharest, with 15.000 square meters of expositional surface. At that time being one of Europe's most emblematic exhibition center. Other important events: in 1964 the first Exhibition of National Economics' Achievements; 1970 Bucharest International Fair (TIB), with more than 1000 exhibitors, from 30 countries (from which 18 official participations); in 1974 the first edition of TIBCO – The International Fair of Consuming Goods Bucharest. After 1990 started the diversification of the events, step by step, Romexpo reached over 40 exhibitions, fairs and commercial saloons (Romexpo).

At the middle of the years 2000, many voices, especially industrial companies, affirmed that the era of expos started to fall, exhibitions started to lose their importance and advantages. The increasing cost for participating to expos weren't supported by corresponding commercial and financial results.

The main objectives of participation to fairs and exhibitions

By the beginning of the exhibitions era or in its "golden age", the main objective was to "show up", and fighting for prestige, to show the progresses they made, just as above mentioned in the title of the first Great Exhibition of the Works of Industry of All Nations in London. Later the main focus moved to market development, signing new contracts and following competition, at least from the point of view of companies. (Torocsik, 1996). We can observe a conflict or a gap of influence between the function of exposing versus selling. More and more companies want demonstrable results on short or medium term, meaning that a company considers a fair successful if they sign enough sales contracts, or gets enough buying orders in the following months to cover the costs related to the fair. This change in the objectives influences decisively the decisions related to the participation to different fairs and exhibitions. So, the increasing costs of participation, the behavior of visitors and the efficiency of methods and tools used at fairs.

The increase of competition forces companies to do more rigorous cost and efficiency calculations, better calculated investments, inclusive in industrial marketing communication and as part of this, in participations on exhibitions and fairs. As presented earlier, the simple showing up with progresses made, is not enough anymore. On contrary, every participation to an industrial fair should mean reaching marketing objectives, which are decided earlier: launching new products (with the purpose of selling, getting orders or at least of testing the reaction of the market), contacting new customers, increasing sales to existing customers, creating new selling situations (Kotler, Keller, 2006).

Exhibitions in Industry 4.0

Re-launching the exhibitions trough new concepts

The above presented factors require a new approach in organizing exhibitions. In the first stage by the exhibitors, then as a logical response by the organizers, as a reaction to the new realities of the markets. More precisely, they have to assure the optimal conditions of operation, in order that exhibitors reach their objectives respecting efficiency requirements too. We mean that, it is no more enough "to have nice stand" which is appreciated, or it is not even enough to create a positive image of the company or its products, or even good contracts. All these are compared with the investment: exhibition fees, cost of stand building, logistics' costs, cost with the staff, including transportation, accommodation, organizing costs, salaries etc.). So, organizers have the task to find the business

model, the conception trough which exhibitors can achieve the most ambitious commercial and financial objectives, with the lowest effort.

Hypothesis of research

Participating to many exhibition and fairs, especially the ones dedicated to industries which made important real progresses to Industry 4.0, we observed that management level and high technology used has a real gap compared to the level of what exhibitor firms use in their activity. In the present paper we analyze three Romanian exhibitions / events, with international participation, in the industrial fields (especially metallurgy and industrial engineering) and complementary services.

The hypothesis:

H1 - Industrial exhibitions and fairs started the transition to Industry 4.0

H2 – Industrial exhibitions and fairs from Romania didn't pass the stages to be considered as Industry 4.0 level yet.

Exhibitions in Industry 4.0

A long term efficient answer to the challenges related to organizing and participating to fairs and exhibitions, presented earlier in the paper, could be an integrated system of organizing methods, ICT tools and marketing (communication) tools adapted to the trends, objectives and features of these events. This system would be a step to a new level of development, similar to Industry 4.0. The renowned consultancy company Price Waterhouse Cooper released a study about features of companies from Industry 4.0. An interesting detail presented in that study is the difference between Industry 3.0 and Industry 4.0. „While Industry 3.0 focused on the automation of single machines and processes, Industry 4.0 focuses on the end-to-end digitization of all physical assets and integration into digital ecosystems with value chain partners." (PWC, 2016). In the final part of the present paper we shall analyze three exhibition events related these aspects.

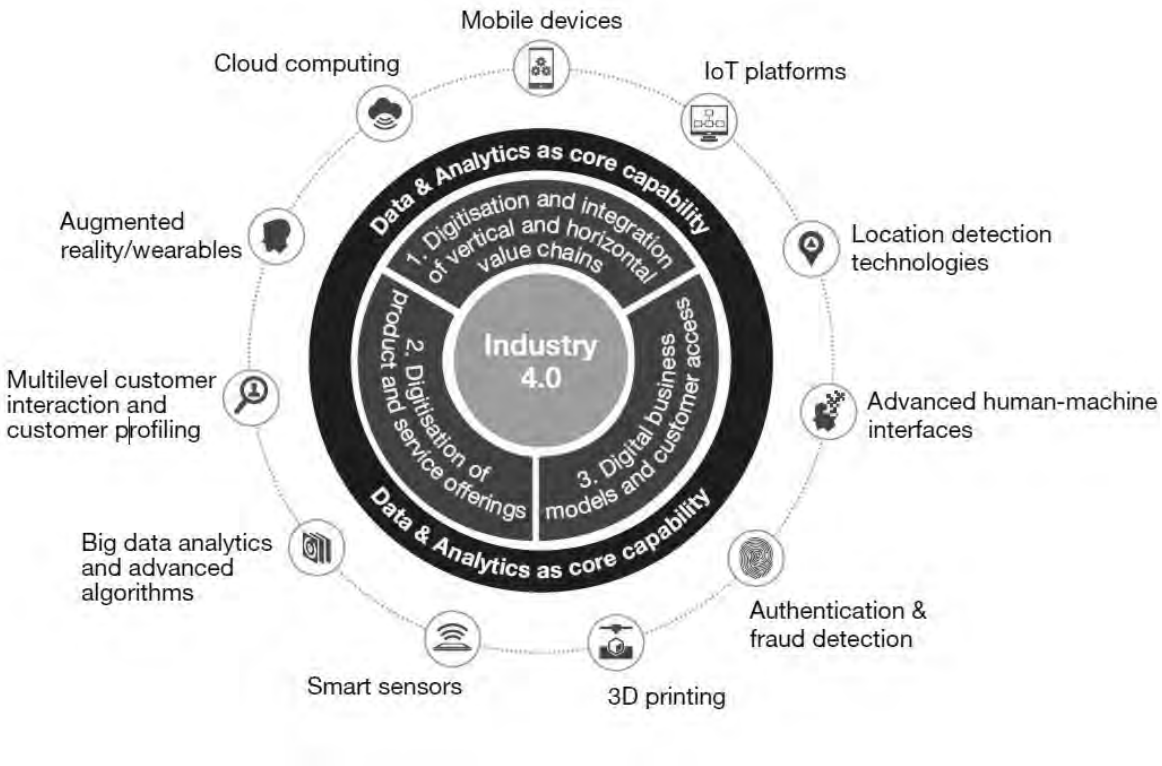

Fig. 1. Features of Industry 4.0 – source: PWC Industry 4.0 Building your digital enterprise

The last decades where characterized by a list of trends in industrial field and exhibition events related to industry. We have to mention the followings: the increasing speed of technological changes, short time for testing technology, renouncing to many innovations, which at first contact looked promising. These trends of industrial development mark also the industrial marketing, including the industrial fairs and exhibitions. (Ford, 2003).

The classical elements of exhibitions' organizing, starting from the architecture or design of exhibition centers, arranging in space the stands, preparing the stands, inviting exhibitors, visitors and other categories, like opinion leaders, preparing and operating the event, contacting potential customers, follow-up, all these should be rethought based on the modern methods and digital tools of Industry 4.0. For example, as Miyagi (2017) proposes with the help of gadgets and softs, one can analyze the flow of people trough the exhibition centers, including movement between pavilions, inside the pavilions, near and by the stands. One can also identify the spots which need to be relieving or on the contrary more activated. These data will help organizers to plan the sizes and positions of stands inside pavilions, arranging pavilions by fields of activity, fields of interest, promotional events by the stands or between them. Specialists can make prognoses based on the recorded flow from previous exhibitions and fairs.

Inviting exhibitors, visitors and opinion leaders. Beside the classical communication channels: television, press (industrial), radio, it is being suggested a combination of marketing communication tools, adapted to the features of specific market niches. These could be: online forums, blogs of specialists, invitation send by e-mails based on targeted newsletter services (as presented later in the case study of B2B Meetings), (business) social media (for example Linkedin). The remarketing, attracting with the support of Google tools, those persons which previously accessed the web pages or applications of the company. This is an efficient tool, because it is addressed to persons which already showed interest to our field by online searches. (The source https://support.google.com/adwords/answer/2453998?hl=ro, accessed 12.01.2018). Using QR codes on invitation (a more complex version of bar codes) can be an efficient tool to monitor the flow.

Monitoring the flow of visitors and follow-up. At certain exhibition events from industrial fields digital registration of participants is becoming an usual habit. Usually organizers use three main categories: exhibitors, visitors and media. Invitations or access badges can use QR codes, magnetic cards, RFID (radio frequency identification), or (micro) chips. These digital tools allow the collection of an important amount of data and information: number of visitors of the exhibition (at general level or by the stands), even detailed by days or hours, contact and other information about the visitors (registered in the system on an earlier occasion). At different key points of the exhibition or at the stand organizers or exhibitors have the possibility to scan (semi) automatic the information about visitors from the digital tools presented above. This information can be used in follow-up campaigns, meaning e-mail or letters to thank the visit they paid, commercials offers if promised, commercial visits, for efficiency analyses of participation to exhibition or of sub events (for example product launching shows, workshops, shows etc.). The automation of data collection and periodical or even real access allows decision taking by the process of the exhibition: changing the stands' layout, modifying the promotion materials, introduction of new elements of attraction etc. So, in the case of some changes on the market, or even in the case of some wrong marketing decisions, decision makers can make urgent changes, without losing the investments on that specific fair or exhibition, or without compromising the medium and long term marketing plans.

All these methods, devices must be used in an integrated concept, systematical, as we can see later in the comparative case studies, considering the targeted niche, its features of activity, typical connections between suppliers and buyers, the types of product and services from that specific field (the volume, value, need of auxiliary services and technical support), location etc.

Comparative case study

A comparative case study of the main Romanian exhibitions and fairs, in the industrial engineering and metallurgy.

We will analyze management methods, the way it takes place, the concepts and instruments used of the following industrial events: Metalshow Bucharest, Demo Metal Arad, Industry Expo and B2B Meetings Timișoara. We have to mention that these analyses, studies doesn't represent a general analyze of the success of the three event. We focus on the elements, concepts, systems which takes

the next step to the Industry 4.0: digital using and analyzing of data, systematic use of mobile devices, smart sensors, advanced human machine interface etc. (PwC Industry 4.0: Building the digital enterprise https://www.pwc.com/gx/en/industries/industries-4.0/landing-page/industry-4.0-building-your-digital-enterprise-april-2016.pdf, accessed 15.01.2018)

Metalshow Bucharest

Metalshow Bucharest International Exhibition for technologies in metal cutting, sheet metal technologies, welding and robotics. Takes places every year, usually in April or May at the Romexpo, Central Pavilion. As general concept, it follows the classical ways of industrial exhibitions and fairs, in the tradition of TIB (Bucharest International Fair), but making improvements by implementing innovative methods and devices. The exhibition stands can be considered regular for this type of events. Based on companies budgets, we can find box shell stands built by exposers, from 3x3 m up, but also individualized stands, with own design (we can say almost architecture) made from metal structures, or carbon, sometimes real buildings. Products and services presented: from simple raw materials, such as steel for constructions, trough semi – finished products with level of complexity more and more increased, professional services to industrial robots and other hi-tech products. Innovative elements used: complex system of registration and monitoring access in exhibition center and stands. Registration is online previously or digitally at the entrance, separated on different categories of participant: organizers, exhibitors, visitors and media. At the registration contact data are collected, as well data regarding segmentation (fields of activity, job, interest etc.). The access in the exhibition center is with the personalized badges with code bar. This way every visitor is known when, how many times entered the center. At the stands, badges can be scanned in 3 seconds, so, exhibitors can also monitor precisely who and when visited the stand. All these information are gathered more rapidly and precisely, than the older lists or customer card. These lists or… can be still useful when an important customer visits the stand and stays longer. Data synchronizing is made daily by the end of program or anytime is needed. Information can be downloaded in excel or .csv formats, which allows administrative work and statistical analyses. Another advantage of this is that companies can launch follow-up campaigns trough targeted newsletters based on segmentation data: company, region, job/ title, sub field of interest. These e-mails can be sent with Aweber, Mailchimp, or other newsletter delivery system. To one category general presentation of the products and services, to others personalized price offers, to others invitations to special events in their region. Exhibitors observed an increased in the amount of information obtained about the visitors, potential customers, with at least 50% compared to usual methods, which weren't enough in periods of high flux of visitors. In conclusion, even it is only an auxiliary instrument, without changing the concept of an event, the registration and access system increased the efficiency of the exhibitions. For organizers and for exhibitors, too.

Demo Metal Vest

Demo Metal Vest, Arad (there is a similar event also in Brasov) – is taking place every year in May. "Starting from the first edition in this region, Demo Metal Vest proved to be a real success, with almost 100 exhibitor companies, 2000 visitors from many countries. High technology, advanced management and production methods, which a few years ago seemed like science-fiction, now starts to be part of day by day activity: 3D robots, high precision tools, innovative production methods, all present at the exhibition." (https://color-metal.ro/ro/blog/demo-metal-vest accessed 15.01.2018). This event uses some innovative methods and devices, such as digital registration of the participants, communication trough newsletters and online platforms with the participants. Their system doesn't allow anyway the automatic registration of the visitors by the exhibition stands, nor the people's flow in exhibition sectors. „The novelty and innovative concept of Demo Metal is based on the practical demonstrations with the exposed equipment. The production process and the equipment used for presentations will become an etalon for visitor specialists and could become a viable option for companies from Romanian industry" – affirm on the organizing team's member. ((http://demometal.ro/despre-eveniment/ accessed 15.01.2018).) The event was completed by mini conferences, professional workshops, networking. A new and appreciated service was the "photomat", which contributes to the promotional activity, leaving a physical souvenir or at request a digital one to participants. This service is not used in a system, but separated. Generally, we can say that digital devices contributes to the organization and operation of the event, bringing some clear benefits to the organizers and exhibitors, but we cannot talk yet about a disruptive or a general innovative effect. In conclusion, some elements, highly digitalized devices, online tools represents a progress, but without the characteristics of an integrated system or a general concept.

Industry Expo and B2B Meetings

Industry Expo and B2B Meetings, Timisoara (there is a similar event in Sibiu, too) organized by Green Roua - Industrialin, is a sort of exhibition with limited access, only for professionals. They propose a new concept (at least for the Romanian market). Starting from the location choice (exclusive, not very large, with the expected facilities for exhibitions, but also catering services), trough digital invitations for exhibitors (the seller category, which offers products, semi- finished products, raw materials and professional services) and in a separated way the special visitors (buyers – industrial companies, from the end of supply chain, usually from automotive industry or industrial engineering). Invitation process is working based on an online registration and meetings planning system. Professional mini conferences or workshops, business lunch are also part of the concept. But the core event is the succession of previously planned speed business meetings. These take place between buyers and sellers for 20 minute each meeting. The online direct registration platform, without digitally sent documents later printed, signed and rescanned (which still dominate most of the exhibitions), and by the interaction between organizers and exhibitors (sellers), and exhibitors and visitors (buyers), based on online programming of the meetings, all this is a powerful digitalized service, but also with human aspect (by the information and facilities offered). One of the main advantages of this innovative concept is the powerful concentration of decision makers from the industry. This way the efficiency of the event increases: important meetings with the right people from your field, relatively small exhibition stands (with lower costs), shorter event periods (other cost cuttings from logistics, transportation, accommodation etc.). The „time is money" concept is also shown in the reduced time allocation for each meeting, actually there is only time for identifying the potential of future partnership. If both partners consider it interesting, they can fix a date for a future private meeting. If not, they can elegantly say good-bye. This aspect is a sort of image of modern society.

The organizers of exhibition events recognized the market trends and they try to keep the pace. Efforts were made by implementing hi-tech tools, specific management methods, but there is still need for a more intense integration of different innovative concepts into a complex concept or system.

The innovative concepts and tools, which characterize the Industry 4.0. are more than necessary in this field, too. But in achieving final objectives one must not forget the human factors either, the organizing measures before, on the event and the follow-up. Don't forget, any fair or exhibition is a meeting among companies, more precisely among persons representing those companies. For them, technology and innovation are tools, which help them to better serve customers, to offer better products and services, to achieve better commercial and financial results. Combining technical elements, with human effort and passions into a harmonized concept can be the key of success for future fair and exhibitions.

The following table presents a comparison analyze of the three exhibition event from the point of view of Industry 4.0.

Table 1. Comparison of the features of Industry 4.0. of the three exhibition events

Features of Industry 4.0	**Industry Expo B2B Meetings**	**Metalshow**	**Demo Metal**
Mobile devices	Yes	Yes	No
IoT platforms	In part, at exhibitors	In part, at exhibitors	In part, at exhibitors
Location detection technologies	In part, at exhibitors	Yes	In part, at exhibitors
Human-machine interfaces	In part	In part	In part, at exhibitors
Authentication & fraud detection	In part	In part	No
3D printing	At some exhibitors	At some exhibitors	At some exhibitors
Smart sensors	At some exhibitors	Yes	At some exhibitors
Big data analytics	No	No	No
Multilevel customer interaction	Yes	In part	In part
Augmented reality	At some exhibitors	At some exhibitors	At some exhibitors
Cloud computing	Yes	Yes	In part
Digitization and integration of vertical and horizontal value chains	Yes	In part	No
Digitization of products and services offering	Yes	In part	At some exhibitors
Digital business models and customer access	Yes	In part	In part

Verifying hypothesis

Conclusion, from the three exhibition events, The Industry Expo and B2B meetings integrates the best the high technology, the organizing and controlling methods into a unique concept. Even if the results of exhibition participants are not yet convincing in every case, we can affirm that concept has the potential for future success. But it presumes an intense participation from every parts, the digital communication needs personal feedback or follow-up or by phone. The human interface, sustained by digital tools and systems can be the key to success in the future for industrial marketing.

H1 – all the three exhibitions introduced some specific elements for Industry 4.0.

So, H1 is confirmed.

H2 – Even if Industry Expo and B2B meetings is top among the studied events in the road to Industry 4.0., generally we cannot affirm that the exhibition events reached the Industry 4.0. level.

So, H2 is confirmed.

Conclusions

The organizers of exhibition events recognized the market trends and they try to keep the pace. Efforts were made by implementing hi-tech tools, specific management methods, but there is still need for a more intense integration of different innovative concepts into a complex concept or system.

The innovative concepts and tools, which characterize the Industry 4.0. are more than necessary in this field, too. But in achieving final objectives one must not forget the human factors either, the organizing measures before, on the event and the follow-up. Don't forget, any fair or exhibition is a meeting among companies, more precisely among persons representing those companies. For them, technology and innovation are tools, which help them to better serve customers, to offer better products and services, to achieve better commercial and financial results. Combining technical elements, with human effort and passions into a harmonized concept can be the key of success for future fair and exhibitions.

References

Anghel, L., Petrescu, E.
2002
Business to Business Marketing, Ediția a II-a, Editura Uranus, București.
Balaure, V. (et al.)
2002
Marketing, Ediția a II-a, Editura Uranus, București.
Ford, D.
2003
Business Marketing, Ediţia 1., Editura KJK Kerszov, Budapesta.
Gomes, M.; Fernandes, T., Brandao, A.
2016
Determinants of brand relevance in a B2B service purchasing context, JOURNAL OF BUSINESS & INDUSTRIAL MARKETING Volume: 31 Issue: 2 Pages: 193-204
Hart, N.,
1998
Marketing industrial, Editura Codecs București
Jozsa, L. , Piskoti, I., Rekettye, G., Veres, Z.
2005
Decision Oriented Marketing, Editura KJK Kerszov, Budapesta.
Kotler. Ph., Keller K.
2006, Marketing menedzsment, Editura Akademiai, Budapesta
Mahlamäki, T., Ojala, M., Myllykangas, M.
2016,
The drivers towards interactive digital sales processes in business-to-business markets, Association for Computing Machinery

Miyagi, Y., Onishi, M., Watanabe, Ch.
2017
Classification and visualization for symbolic people flow data, JOURNAL OF VISUAL LANGUAGES AND COMPUTING Volume: 43 Pages: 91-102
Olteanu, V.
2004
Marketingul Serviciilor, Editura Ecomar, București
Popescu, I.C.
2003
Comunicarea în marketing, Editura Uranus, București
Shaltoni, A.
2017
From websites to social media: exploring the adoption of internet marketing in emerging industrial markets, JOURNAL OF BUSINESS & INDUSTRIAL MARKETING Volume: 32 Issue: 7 Pages: 1009-1019
Singh, J., Shukla, P., Kalafatis, Stavros P.
2017
IT usage for enhancing trade show performance: evidence from the aviation services, JOURNAL OF BUSINESS & INDUSTRIAL MARKETING Volume: 32 Issue: 3 Pages: 398-408
Torocsik, M.
1996
Ipari Marketing, Editura Nemzeti Tankonyvkiado, Budapesta.
Torocsik, M.
2007
Vasarloi magatartas, Editura Akademiai, Budapesta
PwC
Industry 4.0: Building the digital enterprise https://www.pwc.com/gx/en/industries/industries-4.0/landing-page/industry-4.0-building-your-digital-enterprise-april-2016.pdf, accesed 15.01.2018
https://color-metal.ro/ro/blog/demo-metal-vest accesed 15.01.2018
http://demometal.ro/despre-eveniment/ accesed 15.01.2018
https://support.google.com/adwords/answer/2453998?hl=ro, accesed 12.01.2018

EXTENDED α ALGORITHM TO IMPROVE BUSINESS PROCESS IN HEALTHCARE

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Abstract

Purpose *– In this paper, a new algorithm is established to improve business process that has a tremendous impact on organizations' performance. The achieved algorithm is proved mathematically and implemented on real life application belong to health care sector.*

Methodology/approach *– The methodology is to collect data from an organization such as hospitals. Then establishing events logs with all the relations and dependencies between business events. After that, business process and its effects on the performance like the cost, profit, resources and time consuming is discovered. Finally, after implementing the new algorithm the cost, time, and resources will be decreased to increase overall business's profit.*

Findings *– Mathematical and logical operators are deployed to build a new algorithm to approach knowledge discovery that is suitable for any real-life application. Implementing this new algorithm leads to efficient business process and enhances management decisions making.*

Research limitations/implications *– Human abilities became limited comparing to the need of analyzing data being collected in databases and can't be handled without the use of automated analysis techniques. Data, and process mining is evolving to provide automated analysis solutions to understand patterns in data and describe them in a concise and meaningful manner. One of the most demanding sector in industry is health care sector that has been growing largely over the last decade and healthcare services become more complex, costly and highly interconnected dynamic where individuals and teams contribute to serve patients' demand.*

Practical implications *– Business process mining is a key factor for achieving successful management techniques in any business and enhance decisions making process in any industry. It is about proposing an innovative approach that original* ***α algorithm*** *has not approached like the events dependency matrix that include these events and their occurrences, building mathematical and logical operators between events in a log and probabilistic knowledge of dependent events.*

Key words: *α -algorithm, process mining, healthcare.*

Introduction

α-algorithm is an early process mining algorithm and developed to mine concurrent processes and formally proven to correctly mine processes representable by Structured WF-Nets (SWF-Nets), from noise-free logs "Aalst.et.al. (2004)", "Reisig and Grzegorz(1998)". However, it is commonly used, due to its simplicity. In this work α- algorithm is extended to a new algorithm that provides a mathematical model between many events in log file and provide probability calculations for any event in events log to overcome the limitation of using original α-algorithm. patients and hospitals' records are studied using the proposed algorithm to discover the events logs and different resources and their relations, to design a suitable process model that fits the situation.

Data records are classified into relational database engine (MS SQL Serve), then database tables are created to be filled with the correct records information.

The discovering process of a workflow consists of three phases "*Aalst. (2016)":*

- pre-processing: inferring relations between the transitions
- processing: execution of the α algorithm
- post-processing

The extended α- algorithm:

Original α- algorithm studies the following relations "Weijters &Aalst. (2016)":

- Fellow
- Causality
- Parallel
- Un related

Those sets were defined are not closed forms since important operators are not defined like the mutual explosion, and, or relations between events.

If we assume that we have the following event log example and implemented in the following dependency matrix as following:

A1	**A1**	**A2**	**A3**	**A4**	**A5**
A2	0				
A3	1	0			
A4	0	1	0		
A5			1	0	
				1	0

- Where A1, A2, A3, A4, and A5 are events and 0 represents no dependency between them while 1 means there is dependency between these events.

1.2. The mathematical relations explanations:

If ai, aj, Xi, Xj all are events in any log:

If [ai,aj] = (1,1) therefore:

aj→ai because:

if (ai,aj) = (1,0) or (0,1)

(aj,ai) = (1,0) or (0,1)

1. (or) relation ∨:

$X_i \vee X_j$:

$\forall\, a \in A, \exists\, (X_i, X_j) = a$

$\text{Or}\ (X_j, X_i) = a$

2.(and) Λ:

$\forall a \in A , \exists Xi,Xj \mid (Xi,Xj) = (Xj,Xi)$ therefore Xi Λ Xj

$\rightarrow$

$\forall a \in A, a \in (Xi,Xj)$

$a = 1$ therefore Xi $\rightarrow$ Xj

3.(XOR) $\oplus$:

$Xi \oplus Xj$

$\forall a \in A, \exists (Xi, Xj) \mid (Xi, Xj) = a$ and $(Xj, Xi)=1-a$

4.Parallel $||$:

$Xi \mid\mid Xj$

$\forall a \in A, \exists (Xi, Xj) = a$

$(Xi, Xj) = 0$ and $(Xj, Xi) =0$

Contributions

In the above explanation: I am not extending **α-**algorithm only, I am proposing an innovative approach that **α** has not approached like the Matrix that include many events and their occurrences. And in the previous section: **follow, and, or, parallel, and xor relations**, are proved between all the events in a log, and since it has been proven that and, or, not, xor are closed forms logic operators, therefore the algorithm will know the probability of any event in the Matrix which considers it as event learning algorithm.

Facts about the proposed algorithm:

1. The main problem of α algorithm is not written in math" Anoopam & Preeti (2015)", "Aalst.(2009)", so it is difficult to apply it in real life applications while in my extension, I have added math representation of **α** to be optimized.
2. Matrix describes topology of events (process).
3. XOR parameter adds value on the α because some events can't happen with each other in the process.
4. The new algorithm is considered as event learning because:
    - Log files should be defined to identify the events (distinct sets of events)
    - Dependency Matrix should be defined to learn the relations between these distinct events.
    - Log events should include time to know the ordering of those events i.e
      A1 after A0, A3 after A1 and A2.

Event probability calculations

- The events occurrence vector initially = [0 0 0 0 0 …… n]
- Initially all 0 which means there is no action
- It will be 1 if some actions started.
- For each log we have dependency Matrix, studying the dependency between two events only as proposed in "Zayoud.et.al. (2017)"should be achieved but sometimes the occurrence of one event depends on the occurrence for two events such as:
- The conditional probability "Gardiner.(2009)" for two parameters A, and B is:

$$P(A \mid B) = \frac{P(A \cap B)}{P(B)}$$

Therefore

$$P(A \mid B \text{ and } C) = \frac{P(A) \cap p(B \cap C)}{P(B \text{ and } C)}$$

So, if we have $P(\varepsilon \mid \varepsilon i, \varepsilon j) = \frac{P(\varepsilon \mid \varepsilon i) * P(\varepsilon \mid \varepsilon j)}{P(\varepsilon i \times \varepsilon j)}$

- Where **εi X εj** is the occurrence of event **εi** and **εj**

Table 1: Summary between α algorithm and extended α algorithm

α algorithm	**The proposed algorithm**
Process include actions	Define logical operators like (Xor, Or, And, Fellow)
Creates workflow nets	Calculate the probability of any event to be happen

Millions of records for patients in chains of hospitals gathered over ten years in different situations like normal or catastrophic. These records are analyzed and classified based on the α-algorithm and the new extended algorithm and following processes and events model is discovered based on the existed data records as shown in figure 1.

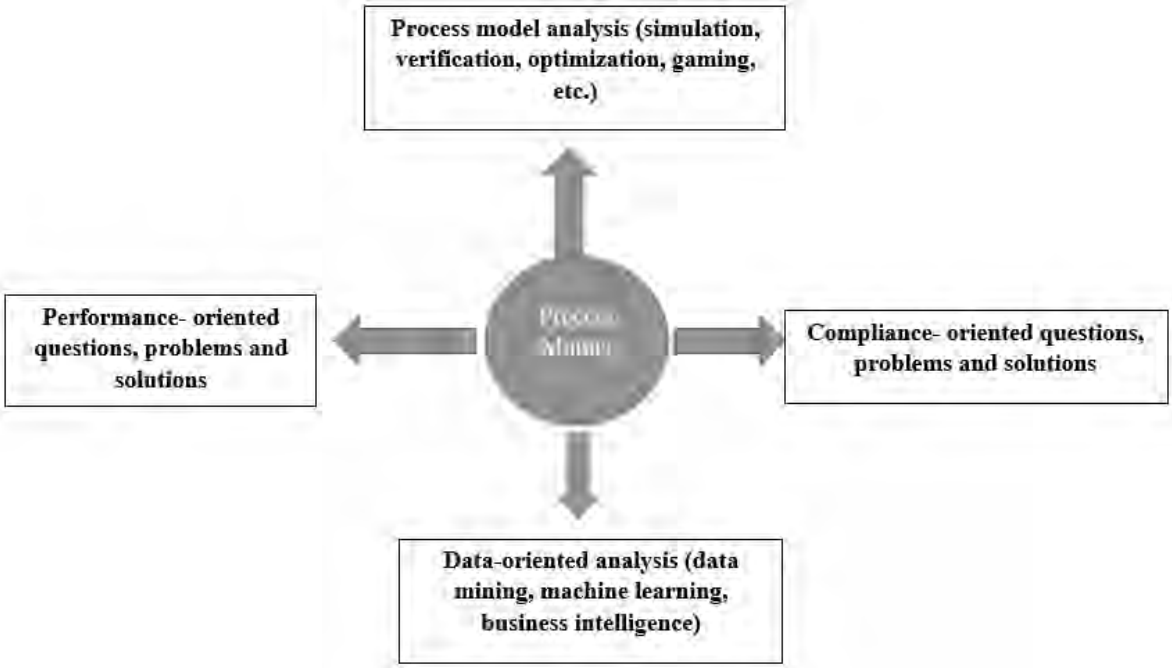

Figure 1 the positioning of process mining meanings "Van Dongen, & Aalst (2004)"

The model in figure 1 is explained as the following:

- **Arrival:** arrival of patient to the hospital.
- **Data Collection:** process of collecting patient information, performed by a nurse once patient arrives to the hospital. In addition to recording arrival time by assigning arrival time of patient to Tnow.
- **Check Urgent:** process of defining the severity level of an arriving patient.
- **Decide:** process of deciding whether the patient case is urgent or not. If the case is urgent then patient is assigned as urgent and moved directly to the examination room. Otherwise, patient is moved to the waiting room. In our model the routing probability here is 25% for severe cases and 75% for non-severe cases.
- **Examination:** process of examination and checkup, performed by a doctor.
- **Waiting room:** non-urgent patients are referred to a waiting room in order to wait for an available nurse/doctor.
- **Treatment by a Nurse:** process of pre-checkup by a nurse until a doctor is available.
- **Release resource:** once the checkup is over, the resource in charge should be released.
- **Examination:** process performed by a doctor in order to examine the arriving patient.
- **Billing:** billing process and registration of file is done before receiving the required treatment or prescription advised by the doctor.
- **Extra Facilities:** decision whether the patient needs extra facilities or no. If yes, then patient is moved to the radiology unit. Otherwise, patient immediately follows the process of treatment (after finalizing registration and payment). In our model, the routing probability here is 75% for patients with extra facilities and 25% for unneeded facilities.
- **Radiology:** represents the radiology unit where patients do X-rays, Citi-Scan, MRI, or other types of imaging as requested by doctors.
- **Treatment:** during this process, patient undergoes the required treatment as prescribed by the doctor. In case of a radiology request, doctors check imaging results before finalizing his diagnosis.

Where resources are considered as:

1. Doctor.
2. Nurse.
3. Transporter.
4. Radiology technician.
5. Accountant.
6. Non-Human resources like: Medical equipment's, beds, and chairs.etc.

The MS SQL server database engine is used to build the database tables "Shraddha,& Maddipatla,(2015)" according to the model shown in figure 2, then the data records of all patients are imported as chunks of data due to big amount of records that cannot be imported by one query and one time to the rational database engine figure 2 shows the tables of the database classified according to the model in figure 2, where the query in figure 3 is to select top 1000 records out of the existed records in a table and as an example. These records that are collected from chain of hospitals over ten years in the past are classified into events and resources according to the model presented in figure 2 and the dependency between the different events is discovered based on the proposed mathematical relations presented in chapter one in this report as well. After all the procedures implemented, a database is created and set for these records on SQL server engine which considers as rational database.

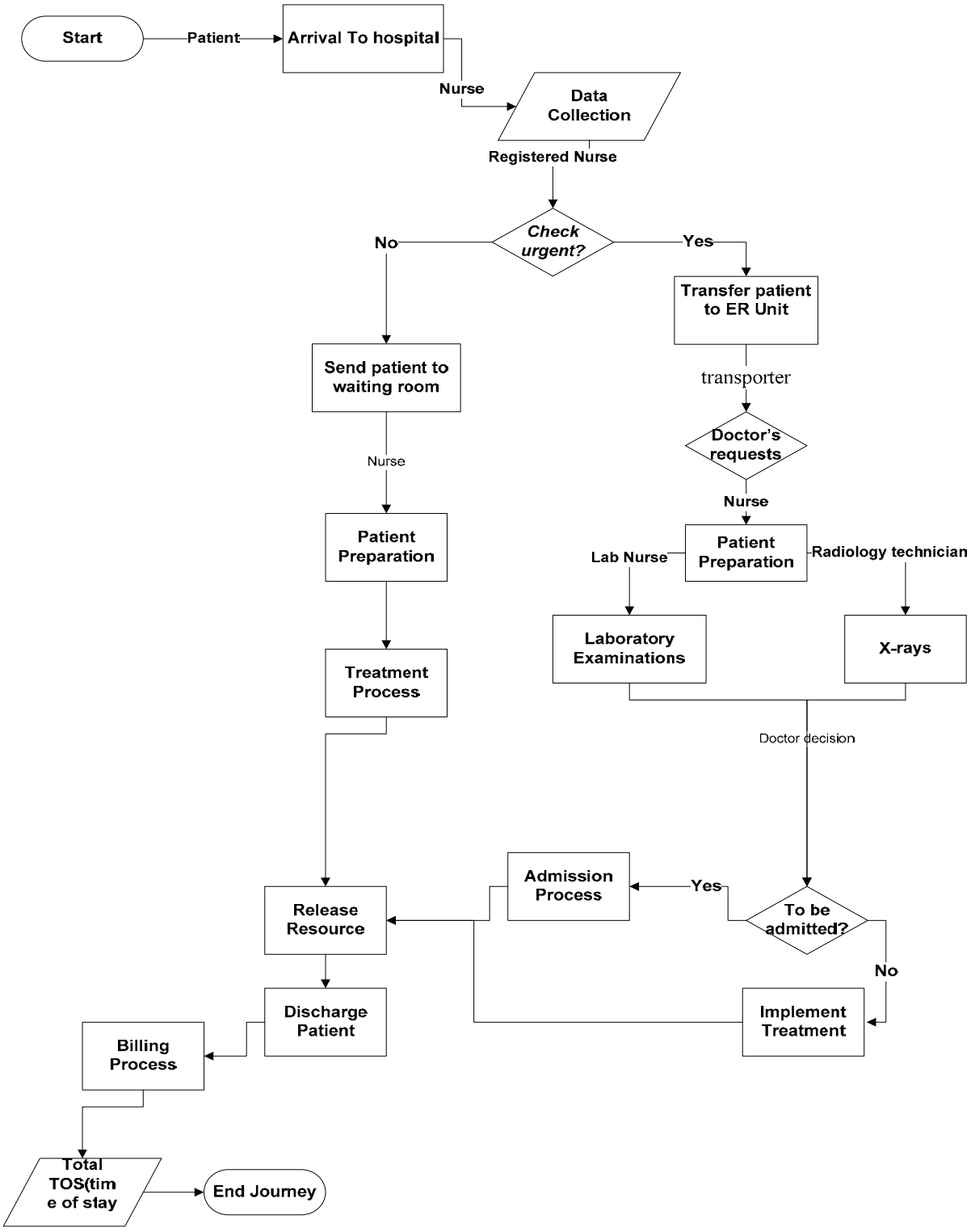

Figure 2. Events log model

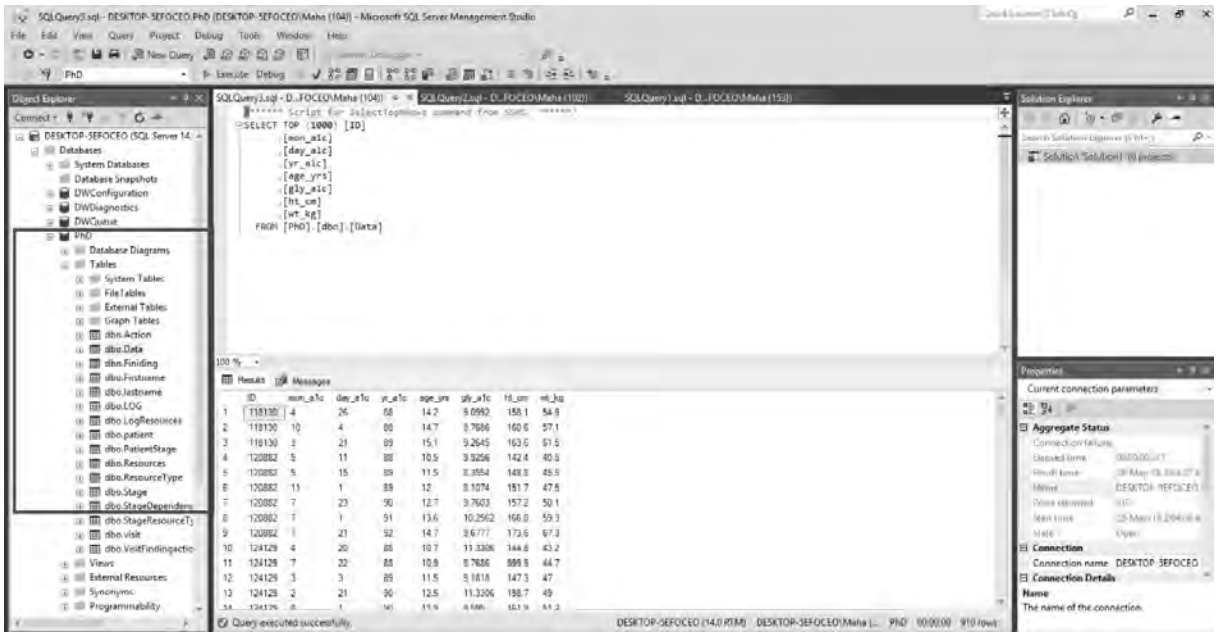

Figure 3. Database Tables

Discussion and conclusions

As a summary to the above work, in this study **α** algorithm is defined and studied in detail, all the algorithm steps and facts are mentioned. Then a new extension of **α** algorithm is proposed to overcome the issues and weaknesses of α and build a mathematical approach that was not defined before in **α** algorithm and to handle different relations between events in any process. A probabilistic calculation to calculate any probability of any event in events log is produced by the extended **α** algorithm.

After that healthcare information is studied based on the proposed algorithm to discover the relations and events logs, classifying the work process into different events and resources and then a model for the entire process is defined. Using the new extended **α** algorithm and the discovered model, a relational database is set, and database tables are created. Then with the proper queries, all the data records are imported successfully but with some issues and difficulties and time-consuming issues, all what has been done has impact on improving the business process by applying newer data management techniques that leads to better understanding of any problem and overcome the limitation by giving better solutions.

As a future work for the next phase is to work on optimizing the extended α algorithm, by showing the statistical and probabilistic results and reports that will present clear image of the problems that face the business industry (Hospitals in my situation), After that, implementing mining techniques that can be proven by mathematical calculations and simulations on big data systems.

References

Anoopam, B., Preeti, G.
2015
Extension to Alpha Algorithm for Process Mining, International Journal Of Engineering And Computer Science ISSN: 2319-7242.Volume 4 Issue 9 Sep 2015, Page No. 14383-14386.
Gardiner, C.
2009
Stochastic methods (Vol. 4). Berlin: springer.
Keller, G., and Thomas, T.
1998
SAP R/3 process oriented implementation. Addison-Wesley Longman Publishing Co., Inc.
Moreno, J.L.
2013

"Who shall survive? A new Approach to the problem of human interrelations."
Nemati, H. R., and Christopher, D., B.
2004
Organizational data mining: leveraging enterprise data resources for optimal performance. IGI Global.
Reisig, W., and Grzegorz, R.
1998
Lectures on petri nets i: basic models: advances in petri nets. Vol. 1491. Springer Science & Business Media.
Shraddha, A., Maddipatla, K.P.
2015
A Transformation from Relational Databases to Big Data, International Journal of Engineering and Computer Science, ISSN: 2319-7242, Volume 4 Issue 9 Sep 2015, Page No. 14378-14381.
Van der Aalst, W. M., Weijters, A., & Maruster, L.
2004
Workflow Mining: Discovering process models from event logs. IEEE Transactions on Knowledge and Data Engineering, 16(9), 1128–1142.
Van der Aalst, W. M,
2009
Process Mining: Beyond Business Intelligence,
http://www.processmining.org/_media/presentations/processminingtutorialesscass-2009.pdf
Van der Aalst, W. M.
2016
Process Mining - Data Science in Action. Berlin, Germany: Springer-Verlag Berlin Heidelberg.
Van Dongen, B. F., & van der Aalst, W. M.
2004
Multi-Phase Process Mining: Building Instance Graphs. 23rd International Conference on Conceptual Modeling (pp. 362-376). Shanghai, China: Springer-Verlag Berlin Heidelberg.
Weijters, A. J., & van der Aalst, W. M.
2003
Rediscovering Workflow Models from Event- Based Data using Little Thumb. Integrated Computer-Aided Engineering, 10(2), 151–162.
Zayoud, M., Oueida, S., Kotb, Y., & AbiChar, P.
2017
A probabilistic approach for threaded process learning. In Computing and Communication Workshop and Conference (CCWC), 2017 IEEE 7th Annual (pp. 1-6). IEEE.

POKA YOKE APPLICATION SYNTHESIS IN MANUFACTURING ENGINEERING

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Abstract

Purpose *– The present paper aims at carrying out a study to identify possible errors in the design and manufacturing phase and also to highlight the benefits of the poka yoke mechanisms and reducing the costs and losses caused by various errors in the design constructive and Lean manufacturing process.*

Methodology/approach *– Research methodology includes identifying and structuring losses caused by various errors in the design process and then the manufacturing process of a product.*

Findings *– Following this analysis, some practical solutions will be presented both in the design phase and in the manufacturing process, which will contribute to the product's functions (protection, ease of operation, reduction of operating times, correct operation and product quality), elimination of possible deviations by an incorrect positioning of the processed product and reduction of auxiliary times and implicitly of the manufacturing cycle.*

Research limitations/implications *– After analyzing the losses caused by various errors, poka yoke type mechanisms were implemented to eliminate errors starting from the design phase and then in the process of product manufacturing.*

Originality/value *– Following this research, we will offer some practical innovative solutions that will help to avoid possible errors both in the design phase and in the production process of a product.*

Key words: *poka yoke, Lean manufacturing, manufacturing engineering.*

Introduction

In the context of globalization and competitiveness increasing of companies, more and more top companies from different industries focus on increasing productivity efficiency by implementing the best practices worldwide. Bjørge Timenes Laugen et all, in his paper "Best manufacturing practices, What do the best-performing companies do?" highlights the fact that the best practices in production are found in the top level companies that have improved their performance due to these practices in a remarkable way (Bjørge et al, 2005).

In the same paper Bjørge Timenes Laugen et al, highlights that manufacturing companies need to constantly adapt to the new performance requirements in terms of quality, flexibility, speed and costs (Bjørge et al, 2005).

According to the study by Nelson Sizwe Madonsela and others, the trend in best practices for the sustainable development of manufacturing companies is investing in human capital that is needed continuos innovation and continuos improvement of the operational processes (even if in some companies the trend is to invest more in acquiring new manufacturing technologies to the detriment of human talent development), then in advanced technologies and research development activities (Nelson, Sambil, Charles, 2017).

One of the best known techniques / methods of continuous improvement, cost reduction and process efficiency is Lean Manufacturing (Gianluca, Joel, Paolo, 2017), (Philipp, Thomas 2016).

The way in which Lean thinking can influence the increase in efficiency in the sphere of production is also described in Bungau C., et al, 2010, Bungau C., et al, 2011, Bungau C., et al, 2011, Bungau C., et al, 2012, Bungau C., et al, 2014.

This concept has been developed to reduce and eliminate losses, focusing on the continuous improvement of all operational processes by implementing Lean Manufacturing-specific techniques such as Value Stream Mapping, Kaizen, PDCA, Total Productive Maintenance (TPM), Poka Yoke, just in time, 5S, kanban, single minute exchange of die (SMED), Pull System, etc. (Womack, Jones, Ross, 1991).

The implementation of these methods within a Lean company leads to company sustainability and also helps to create a work place where the problems are easily and quickly identified, so that losses (in different forms) are reduced in the processes (Sri, Udisubakti, 2015).

In Lean Manufacturing, the terminology used for loss/waste is Muda (Augustyn, Krzysztof, 2018).

In the production process, Taichi Ohno identified 7 losses (overproduction, waiting, transporting, over processing, motion, inventory, defects) (Taichi Ohno, 1988), and then two more losses were identified (not utilized human talent and unsafe or ergonomic working conditions) according to figure 1 (Magdalena, Beata, 2017). (Magdalena, Beata, 2017).

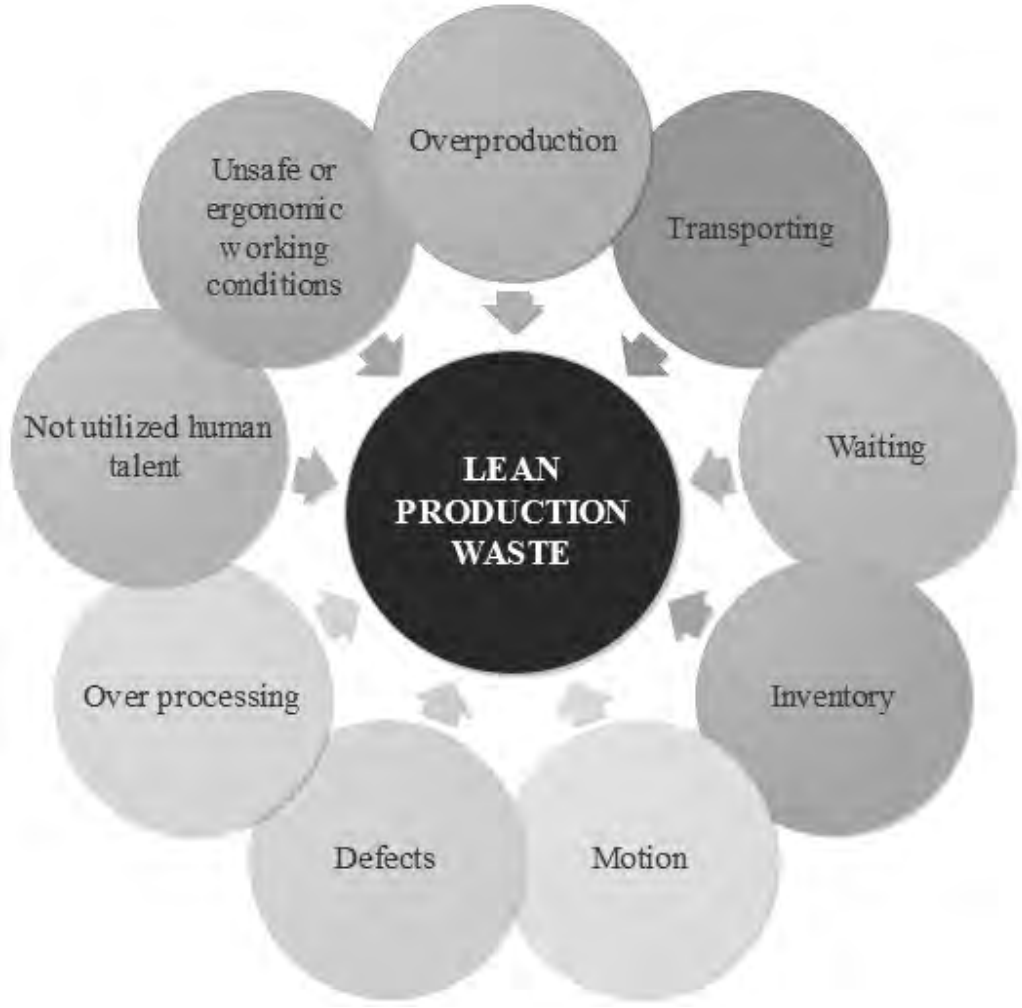

Figure 1. The 9 losses identified in a production process. Source: Own processing based on information from Taichi 1998 and Magdalena and Beata, 2017

The losses identification is achieved using Value Stream Mapping, which is a visual management method that visualizes both material flow and information flow from production process to identify, quantify and configuration of production (William, Samson, Alphonce, 2011).

Other studies confirm that efficient use of resources by minimizing losses is the most important aspect of a Lean Manufacturing production, that ultimately aims is to reduce losses and those non-value activities (activities that do not create value) (Amelia, Muriati, Riza, 2013).

After identifying the losses through VSM implementation, the entire operational flow is analyzed, looking for improvement solutions. Where losses are identified due to certain human errors, innovative solutions are sought to eliminate these errors, and these mechanisms to prevent human errors in Lean production are identified as Poka Yoke (in Japanese) (Antonelli, Stadnicka, 2016).

Regarding the elimination of defects from a manufacturing process, the founder of Toyota Sakichi Toyoda in 1902 developed a concept called Jidoka, which basically means not accepting faults, not to make them and not overlook them, and Poka yoke is a mechanism that helps to avoid possible errors, thus eliminating possible defects. (Pacal D., 2015).

For example, Michael W. et al developed an IT solution using a Raspberry Pi microcontroller that was developed and integrated into the process to establish a Poka Yoke system for correct fastening of a workpiece on a milling machine (Michael, Jörg, 2017).

Considering the technological potential of the manufacturing companies, most of the errors that occur during the production activities are due to the human factor. In order to eliminate this human error, over time have been developed personalized intensive training, different sensors, 3D models and Augmented Reality, but many of the human errors could be removed by developing and innovating some types of poka yoke mechanisms. (Michela, Gino, Franco, 2016).

The specialized literature presents several definitions of the poka yoke mechanism. One of the most well-known definitions presents poka yoke as a mechanism that has the role of preventing errors or the negative impact of errors in a process (Tarcisio, José, Gabriel, 2012), (Anton et al, 2018). The same author defines poka yoke as a device that prevents or detects anomalies that could be to the detriment of product quality or health and employees safety. (Tarcisio, José, Gabriel, 2012).

Given that there is no generally applicable definition in all applied areas, Antonelli D. and Stadnicka defines Poka yoke as being any manufacturing device that assists the human operator throughout the process or during the product quality verification (Antonelli, Stadnicka, 2016).

A Poka yoke mechanism can detect errors at the workpiece, the working method used or regarding certain fixed values, according to figure 2 (Pacal, 2015).

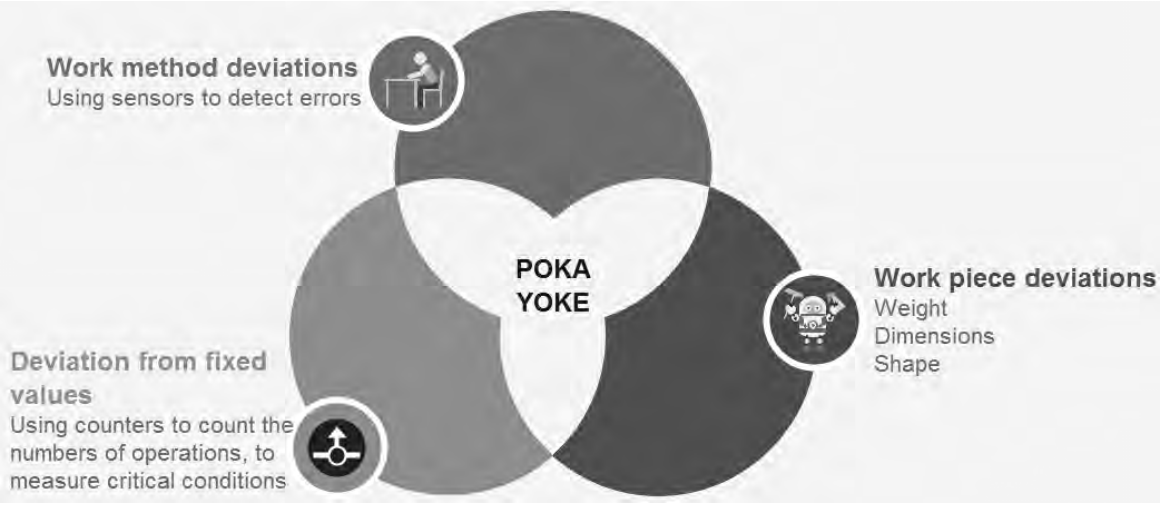

Figure 2. Poka yoke deviations Source: Own processing based on information Pacal, 2015

Both in the design and construction phase as well as the ongoing of the manufacturing process, there may be various errors that represent losses or costs that need to be eliminated. In the constructive design and production process, the Poka Yoke method has proven to be a successful solution for preventing and reducing these losses, respectively the costs caused by possible errors (Juthamas, Monsiri, Phrompong, 2015).

According to Ahmad W. et all, a wrong design of a product has a significant impact on production costs and production volume, that is why companies have to implement the poka yoke mechanism from the design phase of the product, thus eliminating errors and costs caused by errors. (Ahmad et al 2013).

In order to develop a poka yoke mechanism both in the design phase and in the process of manufacturing a product, it is possible to propose the implementation of the PDCA cycle (plan, do, check, act), representing the stages through which design and test the poka yoke mechanism until the final / optimal variant, according to figure 3 (Dudek, Szewieczek, 2009), (Anurag, 2018).

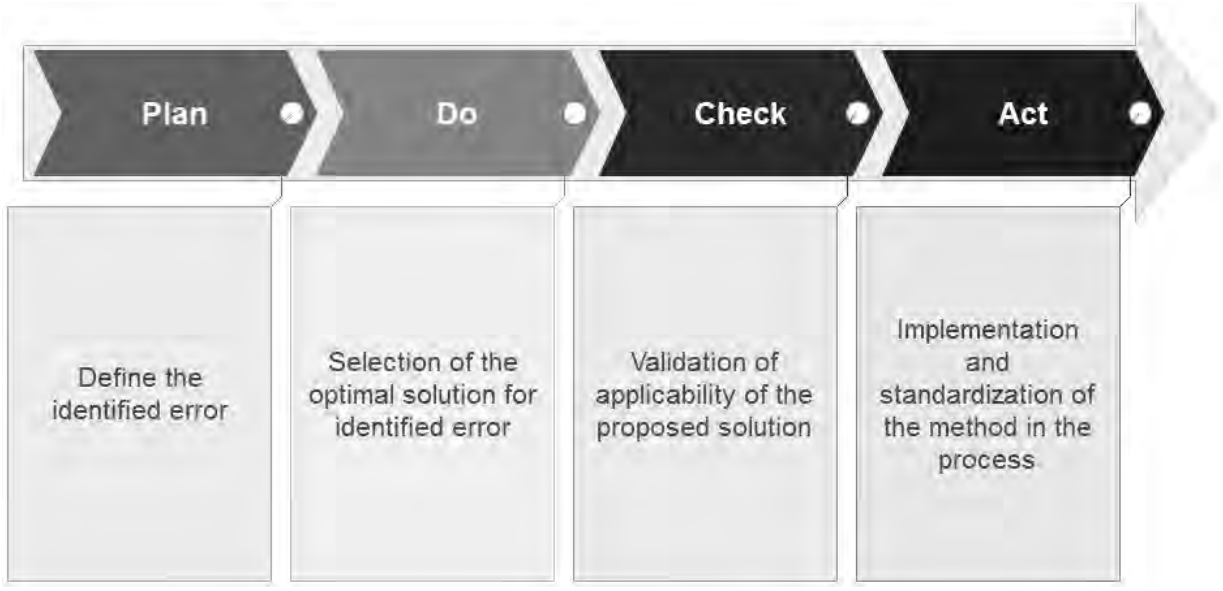

Figure 3. Implementing the PDCA cycle in the developing process of a poka yoke mechanism. Source: Own processing

Types of poka yoke

From the point of view of the error detection method, there are two types of poka yoke methods implemented within the production, namely an active and a passive method. The passive error mechanism uses mechanical typing to ensure that a process is carried out in optimal conditions without the possibility of doing incorrectly, while the active error mechanism uses sensors and visual systems to actively check the process. (Error Proofing Assembly Processes).

At the moment, different companies are looking for innovative solutions to eliminate the occurrence of human errors. In the work "Poka Yoke system based on image analysis and object recognition," Belu et al presents a Poka yoke solution by developing a 3D or 2D dimensional control system using a picture taken from a video camera, which from a digital format is processed and transformed into a binary array, there are also video cameras that capture images at the end of an operation, comparing it to the standard one, and if the captured image does not match the standard image, it emits signals that indicate the occurrence of an error (Belu et al, 2015).

At University of Oradea, Csokmai L. S et al has been developed an off-line version of the software framework for error troubleshooting in a flexible manufacturing system, wich stored the error database on the mobile device and the frame marker device is connected directly to the each FMS components without the need of the PC (Csokmai L. S et al, 2015).

Research methodology

Research methodology includes identifying and structuring losses caused by various errors in the design process and then the manufacturing process of a product.

By eliminating errors in the constructive design phase it is meant to create a form of the finished product that eliminates the possibility of using the product in a wrong way, respectively mistakes during product exploitation.

Regarding errors eliminating from the technological process, it is understood the elimination of positional errors by creating elements that prevent the destruction of machine tools during operation, respectively the wrong execution of the operations during the product production.

These identified losses contribute to the product's functions (protection, ease of operation, reduction of operating times, correct operation and product quality), elimination of possible deviations by a wrong positioning of the processed product and reduction of auxiliary times and implicitly the manufacturing cycle.

Following this analysis the losses from the two phases of product realization were identified (constructive design and manufacturing process), which were categorized according to Table 1.

Table 1. The structuring of errors by categories of losses from Lean Production

Nr. crt.	Waste category	The main losses / errors in the design process and the manufacturing process of a product
1	Defects	inadequate constraints of the designed piece (surface roughness, hardness, thermal treatments)
		errors from position (flatness, circularity, cilindricity) and shape (perpendicularity, parallelism, symmetry, inclination) depending on the part's role and the working conditions
		choosing the right machine for dimensional precision
		the wrong design of the product
		the wrong programming of the CNC machine
		work parameters have not been met
		fixing device of the piece does not correspond to the executed part
		choosing tools, respectively the cutting regime depending on the material processed and the cutting speed, the size of the piece, etc.
		inappropriate choice of the material from which the piece is made (if we have a wide range of products from different types of materials)
		choosing cheaper materials (which do not qualitatively match)
		simulation of the manufacturing process was not carried out;
2	Motion	when choosing the tools, their programming should be done in function of the executed operation
		errors regarding pieces fixing on the working machine (dead times)
3	Unsafe or ergonomic working conditions	machining of the workpiece with tools that do not correspond from the point of view of quality (high tool wear)
		device design errors (the clamping force of the device must be greater than the cutting force)

Discussion and conclusions

The most common types of errors are human errors, and by the development and innovation of poka yoke mechanisms these errors can be eliminated.

Because of this mechanism, manufacturing companies have benefited from increased performance by reducing and eliminating these errors, preventing massive costs (scrap, dead times, mistaken assembled parts, missing components, damaged parts).

Of the 9 losses found in the Lean Production, three types of losses were identified in this paper, as shown in Figure 4.

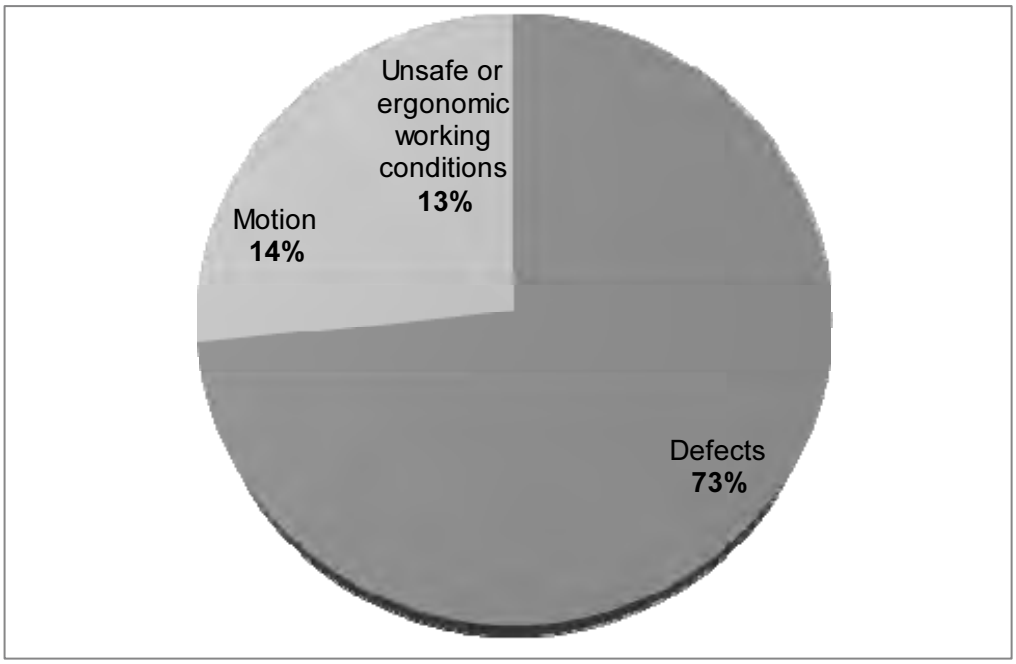

Figure 4. The structure of losses percentage caused by errors. Source: Own processing

The highest percentage of losses caused by certain errors is represented by defects (73%), then motion (14%), and ultimately Unsafe or ergonomic working conditions (13%).

Carry out this study highlights the fact that the Poka yoke mechanisms contribute significantly to the elimination of possible defects in the design process and the manufacturing process of a product

According to the research, the most important benefits that the poka yoke mechanism brings are:

- reducing of redesign requirements, reprocessing and reparation (eliminates certain costs);
- elimination of human error;
- elimination of required inspection (in some cases);
- removes incorrect settings, inappropriate to the process;
- reducing the defect rate, which helps to increase the quality of products and productivity;
- reducing the documentation volume;
- automatic checking of the workpiece;
- reduction of training time spent with the workers;
- achievement of all of stages according to the established order.

References

Amelia, N. Abdul, W., Muriati, M., Riza, S.
2013
A Conceptual Model of Lean Manufacturing Dimensions, The 4th International Conference on Electrical Engineering and Informatics, Procedia Technology 11: 1292 – 1298.
Anton, N.K., Marija, S.K., Ekaterina, V. A., Ilnur, I.M., Dmitrij, F. F.
2018
Analysis of Production Methodologies for Process-Based Management, Helix Vol. 8(1): 2888-2892.
Antonelli, D., Stadnicka, D.
2016
Classification and efficiency estimation of mistake proofing solutions by Fuzzy Inference, IFAC-PapersOnLine 49-12 1134–1139.

Anurag, U.
2018
Implimentation of poka yoke in packing line, International Research Journal of Engineering and Technology, Vol 5: 1411-1412.
Augustyn, L., Krzysztof, P.
2018
Improve the efficiency of the service process as a result of the muda ideology, Management Systems in Production Engineering 26 (2): 112-118.
Belu, N., Ionescu, L. M., Misztal, A., Mazăre, A.
2015
Poka Yoke system based on image analysis and object recognition, Materials Science and Engineering 95:1-6.
Bjørge, T. L., Nuran, A., Harry, B., Jan, F.
2005
Best manufacturing practices. What do the best-performing companies do? International Journal of Operations & Production Management 25 (2): 131-150.
Bungau, C., Blaga, F., Gherghea, C.
2012
Continuous improvement of processes in cutting operations, Review of Management and Economic Engineering, 208-216.
Bungau, C., Blaga, F., Gherghea, I. C.
2011
Method of analysis and audit, used to implement 5S in operational management, Review of Management and Economic Engineering, 36-47.
Bungau, C., Gherghea, I. C., Prichici, M.
2010
Value stream mapping analysis, efficency methods of operational management, Review of Management and Economic Engineering, 188-198.
Bungau, C., Groza, M., Buidos, T., Gherghea, I. C.
2011
Measurement system used in the implementation of 5S, Proceedings of Conference: International scientific assembly ES-NBE 2011 Economic Science in Function of Creating a New Business Environment, 667-679.
Bungău, C., Blaga, F., Gherghea, C.
2014
Kaizen implementation for cost reduction in manufacturing process product "driver control board", International Conference on Production Research – Africa, Europe and Middle East, ICPR-QIEM.
Error Proofing Assembly Processes http://usa.balluff.com/OTPDF/237199_Error-proofing.pdf.
Csokmai, L. S., Ţarcă, R. C., Bungău, C., Husi, G.
2015
A Comprehensive Approach to Off-line Advanced Error Troubleshooting in Intelligent Manufacturing Systems, International Journal Of Computers Communications & Control 10(1): 30-37.
Gianluca, D., Joel, S. B., Paolo, C.
2017
A novel methodology to integrate Manufacturing Execution Systems with the lean manufacturing approach, Procedia Manufacturing 11: 2243 – 2251.
Juthamas, C., Monsiri, O., Phrompong, S.
2015
Improving the productivity of sheet metal stamping subassembly area using the application of lean manufacturing principles, Procedia Manufacturing 2: 102 – 107.
Dudek Burlikowska, M., Szewieczek, D.
2009
The Poka Yoke method as an improving quality tool of operations in the process, Journal of Achievements in Materials and Manufacturing Engineering Vol 36:1, 95-102.
Magdalena, K. W., Beata, M.
2017
Mirages of Lean Manufacturing in Practice, Procedia Engineering 182: 780 – 785.

Michael, W., Jörg, B. Joachim, M.
2017
Development of an optical object detection solution for defect prevention in a Learning Factory, Procedia Manufacturing 9: 190 – 197.
Michela, D. M., Gino, D., Franco, F.
2016
An integrated environment based on augmented reality and sensing device for manual assembly workstations, Procedia CIRP 41: 340 – 345.
Modular Assembly Automation
https://www.youtube.com/watch?v=JXQswvslDQI
Nelson, S. M., Sambil, C. M., Charles, M
2017
Continuous innovation as fundamental enabler for Sustainable business practices, Procedia Manufacturing 8: 278 – 283.
Pacal, D.
2015
Lean production simplifies, CRC Press.
Philipp, H., Thomas, B.
2016
Optimal configuration of manufacturing cells for high flexibility and cost reduction by component substitution, Procedia CIRP 41: 111 – 116.
Sri, H., Udisubakti, C.
2015
The relationship between lean and sustainable manufacturing on performance: literature review, Procedia Manufacturing 4: 38 – 45.
Taichi, O.
1988
Toyota Productivity System, Beyond Large-Scale Production, Productivity Press, Cambridge, MA.
Tarcisio, A. S., José, L. D. R., Gabriel, V.
2012
A framework for assessing poka-yoke devices, Journal of Manufacturing Systems 31: 358– 366.
William, M. G., Samson, M., Alphonce, M.
2011
Use of the Value Stream Mapping tool for waste reduction in manufacturing. case study for bread manufacturing in Zimbabwe, Proceedings of the 2011 International Conference on Industrial Engineering and Operations Management 236 – 241.
Womack, J.P., Jones, D.T., Ross, D.
1991
The Machine that Changed the World: The Story of Lean Production, Harper Collins: New York, NY, USA.

BALANCING CONTRASTING APPROACHES TO DEVELOP AN ONLINE COMMUNITY: THE CASE OF CRE@TIVE.BIZ

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Webpage: http://misp.tuiasi.ro

Abstract

Purpose *– Understanding the demand for developing software applications on time and responding to the users' needs and expectations are the first steps in using the Agile framework in product development and are even more important within the context of research projects, such as CRE@TIVE.BIZ, an ongoing project within the framework of the Romanian National Plan for Research, Development and Innovation 2014 – 2020 (PNCDI III).*

Methodology/approach - *The goal of the project is to develop an open collaboration and innovation platform, CRE@TIVE.BIZ, which will be an experimental model dedicated to create a community where all relevant stakeholders can meet, interact, gain access and share information, knowledge and resources.*

Findings *– The paper presents a comparative analysis of planning and development the Cre@tive.biz platform using Agile's Scrum framework versus traditional Waterfall methodology.*

Practical implications *– The purpose is to survey witch of their methodologies fit best for planning and implementing our project, knowing that this projects description follows the PNCDI II rules, based on waterfall methodology scenario, but develop a software product – the development process could be best done following Scrum framework.*

Originality/value *– The argument to conduct this research is the costs of implementation for Cre@tive.biz platform, and at this point we are referring only at the time that is spent and easily can be converted in money, in each of the methodologies.*

Key words: *Scrum, Crowdsourcing, Open innovation,*

Introduction

Using "the wisdom" of the crowd become a fast and cheap way to push the innovation border from sophisticated processes and expenses facilities in to the middle of the ordinary people. This approach become more and more used due to the many tools to manage crowd's innovation that are cheap and efficient and can easily lead the process and come with tangible results. What is really amazing is that all the digital tools developed to facilitate this interaction can connect "crowd" from every ware so that the chance to develop good ideas it's raise exponential. Another component is the maturity of the market form both sides – companies but also "the crowd" – that understand that working together can boost the products and have access to the latest discoveries in the area.

Mentioning about the numerous numbers of tools to manage the wisdom of crowd, it's important to say that those tools are, like every piece of software, fast consuming due to new development technology that come with new and fast way to resolve same issue. Those tools develop a market that produce a lot of small components to manage the interactions with the crowd, components that are faster and performant each day.

These assumptions are even more valid when it comes to the software industry and over the past years many companies have fundamentally changed the way they tackle challenges when it comes to online

instruments and applications development and started to replace the traditional plan-driven approaches with Agile software development (ASD) (Dyba and Dingsøyr, 2008).

These are just few arguments to create and fallow a plan that ensure fast delivery of a product, fully functional, meeting users' requirements still competitive on prices and easy to maintain. From the beginning we will assume that these are arguments to use Scrum - the Agile's methodology used for implement the software applications – however we may see that the traditional water fall methodology have its own advantages.

An overview of the Agile framework, focus on Scrum Methodology and traditional Waterfall methodology

Changing the paradigm of managing projects to Agile methodologies is the topic of the latest couple of decades when software industry become present in almost every aspects of a business, that put an enormous pressure to the time of delivery and quality of the software delivered.

According to Cunningham [2] the agile framework is based on and is promoting the following values: "***Individuals and interactions*** over processes and tools; ***Working software*** over comprehensive documentation; ***Customer collaboration*** over contract negotiation; ***Responding to change*** over following a plan; That is, while there is value in the items on the right, we value the items on the left more". The Agile framework recognizes five well-known processes like Extreme programing (XP), SCRUM, Feature Driven Development (FDD), Test Driven Development (TDD) and Lean Software Development.

SCRUM is one of most used Agile methodologies in the software industry. The SBOK Guide (SCRUMstudy, 2014) recognize 19 processes grouped into following five stages as presented below:

1. Initiate, that include the processes related to initiation of the project.;
2. Plan and Estimate, consists of processes related to planning and estimating tasks.
3. Implement – execution of the tasks and activities to create project's product. these activities include creating the various deliverables.
4. Review and retrospect which include is concerning with reviewing the deliverables and the work that has been done and determining ways to improve the practices and methods used to do project work.
5. Release is the phase that emphasizes on delivering the Accepted Deliverables to the customer and identifying, documenting and internalizing the lessons learned during the project.

A great overview of the Scrum methodology is offered by Justice (Justice, 2018) on his blog, described above.

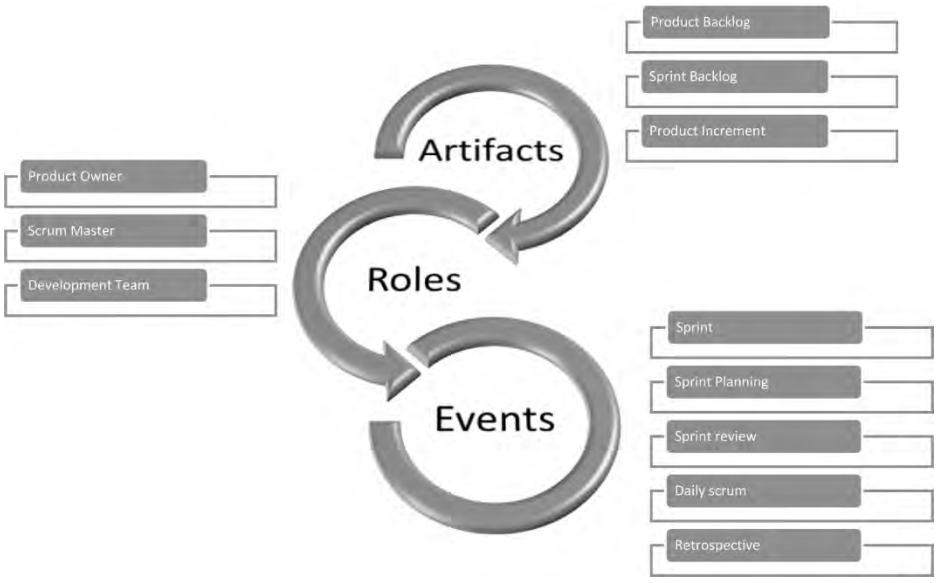

Figure 1. Scrum's essential process

The Scrum methodology recognize three process's essential elements (Figure 1 - Scrum's essential process): 1) Scrum Team – covering three most important roles in the Scrum Methodology – Product Owner represent the Stakeholders interests in the project; Scrum Master is responsible with Scrum adoption in the team and Scrum Team – consist of professionals who are self-organizing and cross-functional, 2) Events (ceremonies) – all the meetings held by the development team (and here we can define three specific), time boxed usually meant to improve the process, and 3) Artifacts – any piece of documentation produced by Scrum team to document the process.

There are following **Ceremonies** in Scrum: 1) Sprint Planning Meeting is time boxed and gather the whole Scrum team (Product Owner, Scrum Master and Development team) to decide what is to be developed in the next sprint based on Product Backlog and how the Sprint goal it will be delivered and that will be happened when all necessary tasks will be delivered. Depending of the length of the sprint the meeting could take 2 to 4 hours; 2) Daily Scrum Meeting is a 15 minute daily meeting during Project lifespan, at same time in a day, in same place of the office, when each member of the Development team explains what do they accomplished since last meeting, what they are going to do until next meeting and if they meet any obstacles in their work; 3) Sprint Review/Demonstration Meeting it's a meeting held at the end of each sprint to demonstrate that the sprint goal was achieved and all the deliverables are done according with definition of "done". The Product owner review and accept the sprint; 4) Sprint Retrospection Meeting, is the meeting where entire scrum team revises the way of work in that particular sprint to make it more efficient. If Sprint review focused on the results of the sprint, Sprint retrospection focus on process of doing the deliverable to improve.

The **Scrum Artifacts** are: 1) The Product Backlog is an ordered list of everything that should be needed in the product and a single source of requirements for the project. All that information is presented here as Epics, User stories, Tasks create from decomposing the Project requirements, from top to bottom at the level of tasks or Bugs resulting from testing scenarios run for all the implemented items. All the changes are documented and included here. It's a living document in property of Product Owner. 2) Sprint Backlog it's a set of Product Backlog items selected for the Sprint by the Development team and commit to be delivered to achieve the Sprint goal; 3) Product Increment is resulting from the work of development team that meet the condition of definition of "*done*" assumed by Scrum Team and consist of thoroughly tested code that has been built into an executable.

The waterfall methodology it uses a sequential approach for the project activities, meaning that no activity will start unless the previous was finished and verified even re-worked, if it's necessary. The sequential model suffered some adjustments lately, coming back to previous activity for resolving minor issues or even to the analyses phase when major issues rise, are only few of those. The activities are articulated taking into consideration the entire project lifecycle: initiation, design and plan, execution, monitor and control, and closure. For each project development phases, the project team need to clearly define all the aspects of the project: client requirements, project scope, communication plan, resources needed, risk management plan, budget, time management, milestones, etc. The assumption that is considered applying this methodology is that all requirements are captured from the beginning of the initiation phase. Communication with the user is front-loaded into this phase, as the Project Manager does his or her best to get a detailed understanding of the user's requirements. Once this stage is complete, the process runs "downhill" (Hoffer, George and Valacich, 2002). All phases are covered with excellent technical documentation, part of the deliverables, and the approach is very structured that make easier to measure the progress of the project. Covering all the aspects from the beginning, the estimation of the projects activities it's easy to be made at that point also, the testing of the projects' result is easy to run. The project progress is measured against the latest baseline of the project plan by whole team during the progress meeting. Those meetings are part of management plan done at the beginning of the project. The tools to measure progress in the waterfall methodology could be: Gantt charts, risk matrix, raci matrix, network diagram, critical path, resource allocation plan, etc.

The case of Cre@tive.biz platform development

The project proposal aim for Cre@tive.biz is to create an innovation platform, sustained by a community with relevant stakeholders, with three components: crowdsourcing, where the visitors and also the users can address questions and find answers, share creative ideas in order to receive feedback, find solutions to different problems, interact with third parties form the same industry, share and find opportunities, find partners and collaborators, etc.; marketplace for finding relevant providers of products or services needed, addressing a targeted market (for the providers), buying and selling products and services related to creative industry and e-shop for presenting the products/services and selling them to a wider online market; promoting products and services from creative industries. All these components should address the needs and wants of our target groups, namely entrepreneurs from specific creative industries.

Developing Cre@tie.biz platform was designed to be done using the traditional waterfall methodologies. On the other hand developing the software component of the project demand using Scrum for its advantage. Following same steps in the lifecycle of the project we have describes and compare how the project could be implemented in Scrum but also in traditional waterfall:

Using scrum	Using waterfall
1. Initiate the project.	
Preparing to initiate the project we can observe that in the project there is two distinct phases in the project lifecycle: 1) Academic research phase where the project team survey the crowdsources and open innovation phenomena and extract valuable results. Based on that the second phases start 2) The Cre@tive.biz platform is build based on research's findings and conclusions. This separation is needed for Scrum approach in order to better prepare the context of project initiation. As is mentioning in the last article (Bagiu, Avasilcăi and Alexa, 2018) the project team will be split in two parts – researcher's teams and the software's team – to covers those two phases of the project. The researchers will develop the Project Vision of the project which will be the base for Product Backlog. The Product Backlog will be created and maintained by project director, who knows best the project. The definition of done will consist in any valuable results comes applying the correct academic research methodology. For second half of the team, form by professionals who can implement the software to deliver Cre@tive.biz platform required. They will start the project later but, to save time, they will have a valuable input in describing the hypothesis of technical approach to the end users. Involve them in early stages of the project may avoid problems caused by technical challenges that may occur. The Scrum Master will be assigned from the beginning to assure accuracy of the process. The Product Owner will be appointed in this stage and will cover both implementation phases of the project.	The project description is following the waterfall methodology, which was a requirement of the financier. This description goes to the level of activities with specific results, resources needed and timeline. The project team is fixed already in the beginning and every member have specific role in the project. For each stages there are deliverables that needs to be done as a results of project activities. Those activities are described well enough to be able to easily identify what is needed to be done. The time estimation for the activities is also present in this description. These estimations give us the deadlines and milestones for project's activities and is closed related with resources needed to achieve them. Still we need to underline that the project doesn't take into the consideration the dynamic of the software industry when it comes to describe the software platform. This wouldn't be a big issue in this stage knowing that a lot of pieces of software was developed using waterfall methodologies. The Project's director is person that know all the project aspects and the results need to be delivered. She is responsible for assign the tasks to the team, monitor and evaluate the activities of the team and report to the financier. The tools should be used in this case could be: individual reports and time sheets, progress meetings, decision statements, etc. As a remark, this planning effort, usually, is left behind, not recorded anywhere, as an investment in the research activities but if we count this we may observe that a huge amount of time is spend in order to best describe the objective, activities, expected results and resources needed.
2. Plan and Estimate	
The project already inherit time constrains from its proposals that Scrum team need to taking care of in process of planning the releases of results. The important part here, to have accurate estimations, is to describe as god is possible the customer's requirements into User stories and decompose into well-defined pieces of work. This part of the project come with an extra-effort and it's needed to have an experienced Product Owner to conduct the process. This extra-effort would raise when the project is not designed and described, from the beginning, to be implemented using Scrum methodology. Based on estimated time calculate we will consider to run 2 weeks Sprint for both phases of the project: research phase & implementation phase. The estimation for implementation phase will be done with development team, incrementally when the tasks are clear and definition of done, in place	From the project description we could easily identify the activities needed to be done in the project and the dependencies of the activities. The Gantt chart of the project was conceived and delivered to the financier. The time units used was one month and there no differences, in description, between research activities and software development. Each activity has, already, a dead line and the deliverables, resources allocated but, for platform development, the deadline is fixed based on a rough estimation coming form an expert. The risk of technical debt is high in this case and manifesting this risk could add a huge amount of effort and incertitude to the project initial estimations. On the other hand, a good estimation it wasn't possible in this stage due to a lack of information about the specific technologies we will going to use implementing Crea@tive.biz platform.
3. Implement	
There are two kind of deliverables that will be produced in the project: 1.1 Research methodology; Quantitative and qualitative research instruments; Quantitative research reports (statistical analysis); Qualitative	The activities are dependent one with another so that a fast-tracking approach wouldn't be possible. At list the development phase is strongly dependent on research phase where the key elements are defined: who are our target group, what are their needs, how we

Using scrum	Using waterfall
research reports (Focus groups and interviews) as a results of research phase of the project, and 1.2 In-house testing version of the Cre@tive.biz platform; Test cases scenarios and User Manuals for each type of account available on the platform (SMEs and freelancers from creative industries, product and services suppliers, potential clients based on role on the platform); the results of the tests are two types: code or functionality bugs – that will go back to the development team to be resolved; expected results that will make the version of the platform available to production environment. To produce those results the teams will be organized into Scrum teams for two weeks sprint. All the work must be done is included in Product/Sprint Backlog. The Product Owner will clarify all the aspects related with stakeholder's expectation, the sprint goal and document the changes and the Scrum Master will ensure that the process if followed. There will held daily meetings and sprints reviews at the end of each sprint to capture and implement the process adjustments that may be needed. We will use a digital and online Scrum board for whole team where the Product Backlog will be held. All the resolved and closed tasks will be shown into Product backlog and a burndown chart will be generate automatically to capture the progress of the sprint/project. There is no document created after daily meetings because all the tasks are in Sprint backlog and each member of the team describe the status of the tasks: new, active, resolved or closed. Often, at the beginning of the project there are more developers than testers and, at the end is other way around. In this specific example the project encountered some changes so that the first week has only documentation tasks.	will involve in our platform, what are de success stories related with this approach, how other platforms works. There are other kind of deliverables that can be issued later in the project, those are related with the activities that have free lag and aren't on critical path of the project. The platform must be built on the results of the studies, knowing that all the aspects of the shape of our target group could have a major impact on it. To make sure that these will happened the project team will meet every week to evaluate the progress of the activities and asses the risks. Each progress meeting should provide a clear analysis of the progress of the project toward project plan. All deviation from the plan should be analyze and a risk assessment should be done. The meetings are conduct by project's director that know all the details of it. Every meeting will record a meeting minute that may contain the analyses, decision that was made and the progress degree of the project. The project's progress is measured against the initial plan and for major deviation a plan B will be activated. Usually all the changes will be rejected. For accepting the changes, the project director must analyze the proposal and its impact on the time and cost to the initial plan. The risk management is required for keep the project on track, even the risk assessment is done at every phase of the project to update the possible risks and mitigate them. The whole team should be available on entire project even the participation in the project will be different. A big challenge will be to translate the study results into requirements for the platform an make it available to all.
4. Review and retrospect/ Monitor and evaluate	
At the end of each sprint a sprint review meeting will be held by Scrum team to show to Product owner the results of the sprint work. Only the tasks that meet the definition of done is presenting at this meeting. Any lessons learn will be discussed and documented to be included in the implementations process of the project. To have an overview of whole project the team can use another representation – Cumulative flow diagram showing how much effort was spend in the project. These meetings are very important for the team in any phase of the Cre@tive.biz project to assure the team that the deliverables meet the expectations and the development process is follow with customer's expectations delivered.	Monitor and evaluate the progress of the project it's happened at each week. The whole team analyze the project results against the latest project plan. The special attention should be pay to the activities identified on critical path, knowing that if these activities are late, all the project will be late. Small changes will be accepted on the project, especially those that are not harm the project's activities. The tools used for this could be project's Gantt chart, networking diagram (revealing the critical path), resource diagram, communication plan, etc. A very important activity is reporting to the financier, which will take place every quarter and will reveal the progress that the project made toward the plan.
5. Release	
The platform will be implemented and accepted by Product Owner. There will be an intermediary step in delivering the platform to the end users – the acceptance testing step. For that an acceptance test environment will be setup by de development team for Product owner and another relevant stakeholder to test requirements and release acceptance tests to the Development team. The final product will be delivered in live environment when all the tests on acceptance environment are done and with good results, the project required documents are done and a maintenance schedule is setup and agreed with project stakeholders.	The releases will be done as was plan in the release plan. All the outcomes of the project are counted and measure against their latest approved description. There is a formal activity in place that will check all the requirements to see if they are meeting the acceptance criteria that was establish in the beginning of the project. All these verifications are done along with the customer when the project is delivered. The Cre@tive.biz platform will be delivered along with user manual and a technical documentation to cover the maintenance period.

Conclusions

Cre@tive.biz platform will enable the collaboration between members of creative community that will come together. Discovering and sharing new ideas, participating in the communities, finding new business opportunity are just few aspects where Cre@tive.biz will provide strong support and commitment.

Looking for the process of implementing the project we can only remark: a) it's very hard to know all the project implementation aspect at the very beginning, so that, spending too much time to plan the unknown will add more time and effort to the project results. b) when new methodologies are used to improve project implementation process is important to assure that all the team know well enough the requirements of new methodologies and are determined to follow. Using Scrum on Waterfall designed project will add much effort to rich the project scope. c) mixing the academic purposed activities with building a digital platform in the same project it's a big challenge for project team. Even if the team it's very well equipped, thinking differently could bring a lot of extra-effort. d) using different metrics to measures the project progress could annoying the team. If the progress in measured by the number of functionalities delivered on each increment in one case, in the other case the progress is stated by the implementation team due to an empirical process until the whole project is delivered and verify. e) if in the Scrum methodology, managing changes is part of the game in order to adapt and release the best, required by the customer, product, in waterfall the changes aren't allowed what bring, at the end, a new and un-updated product. f) the team roles are different in those two methodologies. Team member participation in the project is needed more than one man knowing everything in it. Still, to have team participation is needed to cultivate a strong participation organization culture, and this take time. g) the contact with the final client is critical, especially when develop a software tool. Adjusting the functionalities in the development phase have chance to deliver an enhanced final product.

Taking into consideration all these aspects maybe a hybrid methodology, that combine aspects from waterfall methodology but also use Agiles' advantages in terms of releasing a desirable software product, well designed and robust, could be a possible answer to our research. Still, such methodology doesn't exist, and to combined just for a project could add more effort than value to the project itself.

Acknowledgments

This work was supported by a grant of the Romanian National Authority for Scientific Research and Innovation, CNCS/CCCDI – UEFISCDI, project number PN-III-P2-2.1-PED-2016-0689, within PNCDI III.

References

Dyba, T. and Dingsøyr, T.
2008
Empirical studies of agile software development: A systematic review, *Information and Software Technology,* vol. 50, no. 9-10, pp. 833–859.
Cunningham, W.
2001
Retrieved from Manifesto for Agile Software Development: http://www.agilemanifesto.org/
SCRUMstudy 2014 SBOK Guide page 35 Pheonix, Arizona: SCRUMstudy.
Justice, J.
2018
The 3-5-5 of Scrum. Retrieved from scruminc: https://www.scruminc.com/the-3-5-3-of-scrum/ accesed august 10, 2018.
Hoffer J.A., George J.F., Valacich J.S.
2002
Modern Systems Analysis and Design, 3rd ed. NJ: Prentice-Hall Int., Inc.
Bagiu, N., Avasilcăi, S. and Alexa, L.
2018
An "Agile" approach to develop a crowdsourcing platform: the case of Cre@tive.biz, Proceedings of ModTech2018 Interantional Conference.

AGILE INNOVATION AND BUSINESS MODEL AGILITY WITHIN ENTERPRISE SYSTEMS

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Abstract

Purpose *– We explored how firms actually create unique combinations of the business model elements and developed a vision and strategy for Industrial Holding FORTUS / Nicolina Plant Corporation establishment.*

Methodology/approach *- We have analyzed business model effectiveness in established organizations and we substantiated some proposals of development of an Industrial Holding, covering a Smart Specialization priority in the North-East Region of Romania, and assuming the Industry 4.0 concept.*

Findings *– Some conclusions and recommendations resulted from the innovation audits, addressed to four Romanian successful SMEs: CALORIS, DFR Systems, ROLIX and WEASEL ART. Also, we drafted the necessity to develop an Investment Platform and Start-up Management structure, specific to Fortus Industrial / Nicolina Plant Corporation - Industry 4.0.*

Research limitations/implications *– Our approach could be also extended outside external organizations' limits, by the activation of networking capabilities that allow knowledge creation and sharing, collaboration and integration with the key stakeholders.*

Practical implications *– In the same conceptual configuration, new industries across Romania could strive to achieve lean manufacturing.*

Originality/value *– Analyzing only four different SMEs case studies and focusing on a Corporation, we have provided practical examples that can support managers to rethink their key micro- and macro-capabilities and to select only the relevant ways to attain a continuous business model development.*

Key words: *Agile Innovation, Industry 4.0, Enterprise Systems.*

Introduction

One definition of organizational innovation is: “production or adoption, assimilation, and exploitation of a value-added novelty in economic and social spheres; renewal and enlargement of products, services, and markets; development of new methods of production; and establishment of new management systems” (Crossan and Apaydin, 2010). It goes beyond the concept of “new-to-the-world” approach, capturing internally-developed innovations, together with other adopted / imitated innovations. Classical innovation methods, typically measuring innovation through patents (Xue and Sambamurthy, 2012), or new products and new markets (Lyytinen and Rose, 2003), have minimal relevance for day-to-day innovation actions, because most common business practices rarely involve the capitalization of patents or allocation of internal R&D funds (Adams, Nelson and Todd, 1992). In this respect, innovation could be considered as an imitation of something already used elsewhere, but new to the organization that adopts it.

Competing in fast-changing economic context, it requires being agile in perceiving and exploiting opportunities to develop innovations, increasing the response to disruptions and enhancing resilience against external threats. This is reflected in the necessity that business models need to change

continuously if firms want to achieve sustainable value creation (Doz & Kosonen, 2008b). Thus, the ability to improve business models is essential for company survival and success, as an approach to reduce the risk of inertia towards change, which often occurs when a company has been successful with the same strategy over time.

It is already accepted that Enterprise Systems is a significant and valuable source of increased productivity and efficiency in organizations. Moreover, Enterprise Systems initiatives are considered as the most lengthy and expensive IT projects of contemporary organizations. Thus, organizations focus on their existing Enterprise Systems, in order to innovate in the competitive business landscape.

Firms benefit from discovering new or applying different business models in order to remain innovative, i.e. in doing a business model innovation or a business model reconfiguration. Companies are required to continually develop and strengthen their ability and to adapt their business model effectively and in a timely manner when an opportunity or threat arises. The strategic reconfiguration of business models is associated with many difficulties which need to be overcome, such as: (1) identifying change needs, (2) overcoming inertia, (3) accepting new structures and choosing adequate approaches to renovation (Batistella, De Toni, De Zan and Pessot, 2017). Business model reconfiguration can benefit from strategic agility, since it is defined as "the ability to continuously adjust and adapt strategic direction in core business, as a function of strategic ambitions and changing circumstances and create not just new products and services, but also new business models and innovative ways to create value for a company".

In this spirit, and in very tight connection with the purpose of being strategically agile, the Industry 4.0 paradigm relies to the connection of physical items such as sensors, devices and enterprise assets, both to each other and to the Internet. In this respect, it implies the existence of a modern, interdisciplinary model for product development, corresponding to a common, integrated and interdisciplinary method, referring to processes and IT solutions. Thus, the production process is divided into small value oriented units, which share information that leads to an increased flexibility and reduction of coordination complexity. So, Industry 4.0 targets to convert the regular machines into self-aware and self-learning ones, in order to improve their overall performance and maintenance management, and the construction of an open, smart manufacturing platform, for industrial-networked information applications, and being consequently very agile when facing strong competitive challenges (Saurabh, Prashant and Santosh, 2018).

Problem formulation

In this paper, we have started from a recent study that made investigation into the "black box" of the business model and certain further research directions that ask for research on patterns of strategizing actions, critical capabilities and activities that request continuously adapting of business models. We explore how firms actually create unique combinations of the business model elements, detailing them in a specific and recognizable manner, in order to create an exclusive value offer and to understand how firms use specific capabilities in dealing with business model innovation.

Also, the present paper deals with the concept of fourth industrial revolution, called Industry 4.0, which allows the achievement of smart, efficient, effective, individualized and customized production solutions at reasonable cost, in the wider context of smart specialization orientation of industrial clusters defined by European public policies. In brief, having a practical simple approach, it results that with the help of faster computers, smarter machines, smaller sensors, cheaper data storage and transmission, it is possible to make machines and products smarter and also capable to communicate with each and learn from each other, consequently developing agile innovation competencies for capitalization the new global market opportunities.

Research method

Starting from the literature review and the understanding of the importance of linking the strategic agility with business modeling approaches, the present work aims to investigate the capabilities that are useful in specific areas of the business model. In particular, we have formulated the following research question: What capabilities should companies make use of and where should they capitalize them in order to effectively and successfully refurbish their business model?

For the multiple-case study, we selected from our clients four enterprises that proved a strategic agility approach by:

- an effective business model improvement;
- an innovative approach for creating value by their actual business model.

Moreover, we preferred companies that were relative successful, in order to reveal the efficacy of their strategic agility and therefore gain better insights from them. We selected different companies in terms of size and kind of industry, aiming to do a detailed analysis and to make a significant comparison.

The research setting isn't connected to a specific industry or to a specific size of company, because we considered it irrelevant for our study. We have analyzed business model effectiveness in established organizations, because such companies are experienced in their day-to-day activity, enabling us to focus on specific building blocks of their business model.

We used several data sources: qualitative and quantitative data from primary sources (innovation audit, done with IMPROVE ACADEMY instrument - https://www.improve-innovation.eu/) and secondary sources (press releases, websites and business materials provided by informants). Multiple data collection methods were adopted in order to ensure a deeper understanding of their time dynamics, increase the information base and to reduce biases. Information sources included the managers (i.e. R&D / marketing directors, people in charge for the relationship with customers and financial officers for revenues/costs).

In the analysis, we explored how firms actually create unique combinations of the business model elements (building blocks), detailing them in a specific and recognizable manner in order to create an exclusive value offer. All the four companies based their successful business model improvement on different sets of capabilities, for the following purposes:

- perceiving opportunities and quickly responding to them (strategy innovation);
- acquire, develop and integrate key resources (resource capitalization);
- connecting the internal and external organizational environment (networking).

Consequently, there is an important need to facilitate the transition of SMEs towards the Industry 4.0 paradigm, to boost their integration into digital / global value chains, complemented with the adoption of specialized digital services and the increasing of data collection associated to their production processes, and comprised in their technological, behavioral and business model change. So, it is intended that stakeholders should develop common approaches, based on an open source platform, and to reinforce cooperation, together with SMEs and other sectorial clusters, along European value chains, surveying both the demand and supply side and providing demonstrational and development services, to accelerate and catalyze the specific processes.

In this respect, i.e. the North-East Region of Romania is very much interested to become an active part of this integration and convergence developing process, in the frame of its Smart Specialization priorities, but also being unfortunately a low income region – a weakness factor in direct connection with its zero Cluster stars in the Sector of Digital Industries, as mentioned in the Cluster Mapping Tool developed by DG Growth of European Commission.

Case studies

Below, we present some conclusions and recommendations resulted from the innovation audits, addressed to four Romanian successful SMEs: CALORIS, DFR Systems, ROLIX and WEASEL ART.

CALORIS case study

After analyzing the options for benchmarking and according with the purpose of the innovation audit, corresponding to the strategy of CALORIS (http://www.caloris.ro/), based on the benchmarking class from the Evaluation Report - IMP³rove Assessment (January 2017), some recommendations were formulated:

- Complementary to the idea management, the value proposition of CALORIS should focus more on licensing or selling internally developed ideas, concepts, patents etc., as result of its R&D&I activities, with the help of an external KAM;
- Life cycle length for most profitable products / services could be extended, by developing some radical innovations;
- Reduced time-to-market period for product/services should be attained by using specific available means (cooperation, customer implication through feedback, marketing/branding techniques, accessing public funding from projects financed by competition, in partnership programs at national and international level etc.);
- The budget set aside for long-term innovation projects should be minimum 10% from the yearly profit, to support the increasing of the number successful incremental innovations projects and making the step forward to radical innovations, which implies more money spent and longer term of expectation;
- Increase allocation of operational profits, according with specific business activities, to service, process, organizational and business model innovation with reasonable percentages (between 1 to 5%, differentiated between categories, the majority going to services innovation), by diminishing contribution of product innovations; in this respect is necessary to make an analyze on the perspectives for different types of innovations implemented by CALORIS and their balance, maybe an option being to orient more activities to consulting, design, testing etc., not mainly to product innovations, as today notice;
- Innovation activities should contribute also to higher operational cost reduction, mainly in processes and at organizational level, with the support of design management instruments and better / more efficient allocation of all type of necessary resources (human, material, knowledge etc.).

DFR Systems case study

After analyzing the options for benchmarking and according with the purpose of the innovation audit, corresponding to the strategy of DFR Systems (http://www.dfr.ro/), based on the benchmarking class from the Evaluation Report - IMP³rove Assessment (December 2016), some recommendations were formulated:

- Complementary to the idea management, the value proposition of DFR Systems should include some licensing or selling internally developed ideas, concepts, patents etc., as result of its R&D&I activities, with the help of an external KAM;
- DFR Systems should increase the number of incremental innovation projects started and completed, by developing its own solutions, improved constantly as performances, through partnerships with R&D entities from Romania and from abroad;
- The budget set aside for long-term innovation projects should be minimum 10% from the yearly profit, to support the increasing of the number successful incremental innovations projects and making the step forward to radical innovations, which implies more money spent and longer term of expectation;
- It's necessary an analyze on types of innovations implemented by DFR systems and their balance, maybe an option being to make some operational profit also from services and process innovations (by consulting, design, testing or other activities), not only from product innovations, as today.

ROLIX case study

After analyzing the options for benchmarking and according with the purpose of the innovation audit, corresponding to the strategy of ROLIX (http://www.rolix.ro/), based on the benchmarking class from the Evaluation Report - IMP³rove Assessment (November 2016), some recommendations were formulated:

- Life cycle length for most profitable products / services could be extended, by developing some radical innovations;
- Keeping reduced time-to-market and time-to-profit parameters for product/services, by using specific available means (cooperation, customer implication through feedback,

marketing/branding techniques, accessing public funding from projects financed by competition, in partnership programs at national and international level etc.);

- ROLIX should increase the number of incremental innovation projects started and completed, for new products and services, by developing its own solutions, improved constantly as performances, through partnerships with R&D entities from Romania and from abroad;
- When dealing with radical innovations, ROLIX, by its own estimation, has obtained no results yet, but has the potential to invest and "transform" the current incremental realizations into radical ones;
- It should be increased the expenditures on innovation with minimum 10% from one year to another, as a strategic decision, because is the only way to maintain competitiveness in the actual economic context;
- Is necessary to make an analyze on the perspectives for different types of innovations implemented by ROLIX and their balance, maybe an option being to re-orient part of the activities, from consulting and design, to product innovations, but still keeping the balance between ROLIX competences and its day-to-day activities.

WEASEL ART case study

After analyzing the options for benchmarking and according with the purpose of the innovation audit, corresponding to the strategy of WEASEL ART (http://www.fabricadeprofile.ro/), based on the benchmarking class from the Evaluation Report - IMP³rove Assessment (January 2017), some recommendations were formulated:

- Complementary to the idea management, the value proposition of WEASEL ART should include – if it's possible - some licensing or selling internally developed ideas, concepts, patents etc., as result of its R&D&I activities, with the help of an external KAM;
- Life cycle length for most profitable products / services could be extended, by developing some radical innovations;
- Continue to keep reduced time-to-market and time-to-profit parameters for product/services by specific available means (cooperation, customer implication through feedback, marketing/branding techniques, accessing public funding from projects financed by competition, in partnership programs at national and international level etc.);
- The budget set aside for long-term innovation projects should be minimum 10% from the yearly profit, to support the increasing of the number successful incremental innovations projects and making the step forward to radical innovations, which implies more money spent and longer term of expectation.

Fortus Corporation / Nicolina Plant - Industry 4.0 case study

Another important case study is focused on the proposal of reconstruction and development of an Industrial Holding, as a private initiative of creating an innovative regional cluster, covering a Smart Specialization priority in the North-East Region of Romania, and assuming the Industry 4.0 concept as its only way to be competitive in the actual global and "aggressive" specialized markets.

It is necessary to develop an Investment Platform and Start-up Management structure, specific to Fortus Industrial / Nicolina Plant Corporation - Industry 4.0, that will initiate, develop and implement two major objectives (see Figure 1):

1. Building the Start-up of the Joint Company, listed on the Bucharest Stock Exchange, Fortus Corporation - Industry 4.0, according to the American corporate model Actuant Corporation (https://www.actuant.com/), listed on the New York Stock Exchange – NYSE;
2. Building Nicolina Plant – Industry 4.0 in the framework of the corporate environment of the World Class Manufacturing System Ecosystem - Lean Manufacturing Industry 4.0, following the Dutch model of HOLMATRO Plant (https://www.holmatro.com/en/).

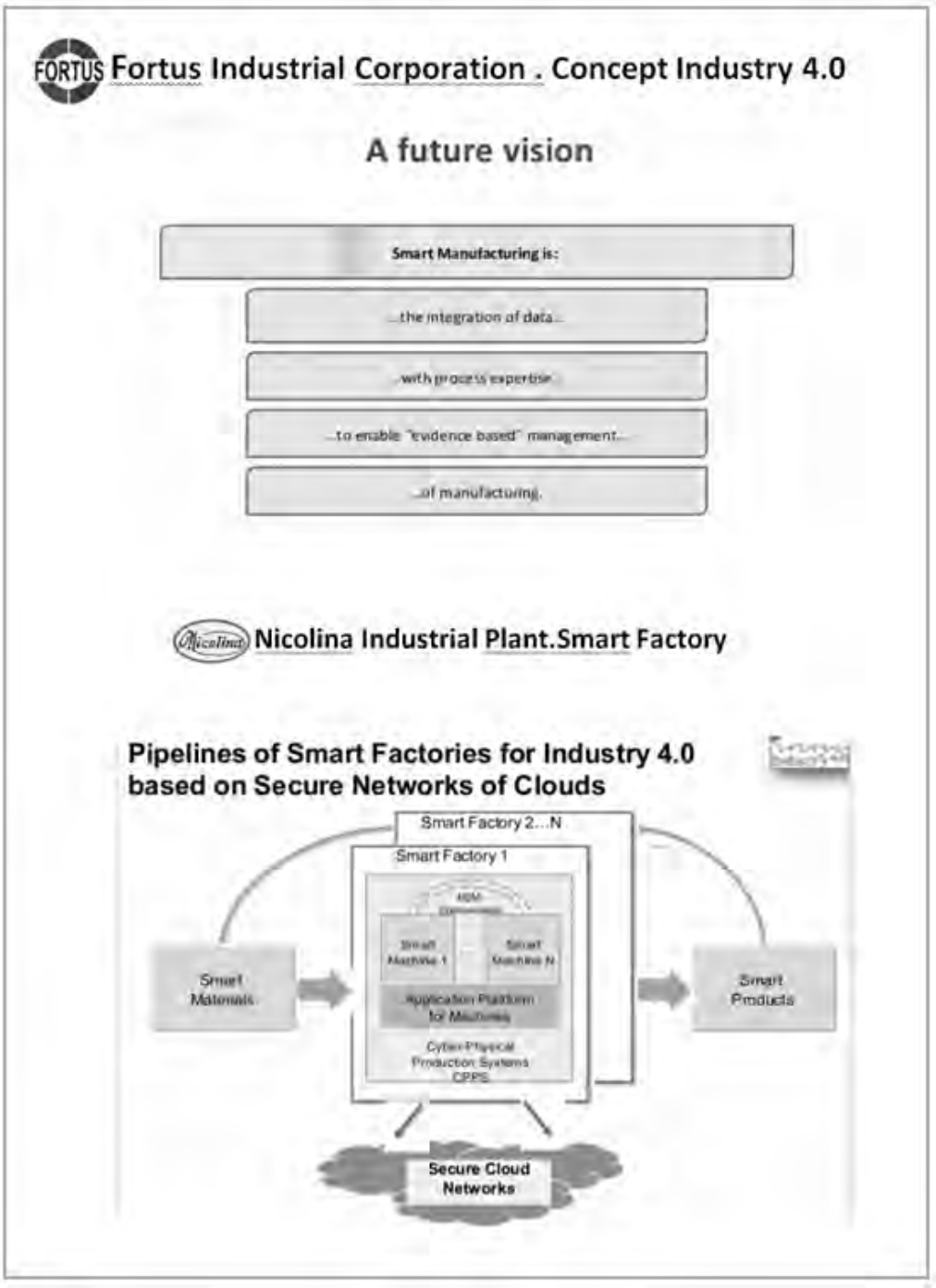

Figure 1: Vision of Smart Factories for Fortus Industrial / Nicolina Plant Corporation - Industry 4.0

Conclusions

In this paper, we have analyzed several macro-capabilities for business model improvement. Firms that succeed to adapt and reconfigure their business models over time are able to identify the best micro-capabilities (already possessed) to be used effectively.

Achieving sustained value creation, through business model innovation, mainly focus on restating the company mission and value offer, in order to improve customer satisfaction and increasing its loyalty, which is possible also thanks to a continuous innovation process and exploiting innovative ideas, sometimes with the extension of business with multilateral (art, culture, sport) initiatives.

Resource capitalization capacities focus both on aligning an organization's employee culture with the sharing of organizational values and teamwork and on fostering leadership positive attitudes, oriented for obtaining higher performance in activity. This approach could be also extended outside external organizations' limits, by the activation of networking capabilities that allow knowledge creation and sharing, collaboration and integration with the key stakeholders, in particular customers, in order to consolidate strategic partnerships. It is important to avoid wasting resources and time and to direct critical capabilities and actions to specific areas of the business model, in order to enable the shaping, adapting and renewing of its content.

Targeting our analyze only on four different SMEs case studies, we have provided practical examples that can support managers to rethink their key micro- and macro-capabilities and, whether or not they pay enough attention to organizational and strategic aspects, to select only the relevant ways to attain a continuous business model development and adaption to the new economic environment requirements.

In the same conceptual configuration, new industries across Romania strive to achieve lean manufacturing, but not every organization is successful in implementing and achieving its benefits. In the above presentation of the vision and strategy for Industrial Holding FORTUS / Nicolina Plant Corporation establishment, complemented with the comprehensive framework of barriers and challenges for lean implementation, we have defined a future vision of Smart Factories approach about how lean manufacturing can be implemented through the technologies of Industry 4.0, i.e., through integrated information and communication systems, the shortcomings of conventional practices can be overcome, in order to improve productivity and eliminate wastes, thus corresponding to the principles of Smart Manufacturing nowadays orientation.

References

Adams, D.A., Nelson, R.R., and Todd, P.A.
1992
"Perceived Usefulness, Ease of Use, and Usage of Information Technology: A Replication," MIS Quarterly (16:2), pp. 227-247.

Cinzia Battistella, Alberto F. De Toni, Giovanni De Zan and Elena Pessot
2017
“Cultivating business model agility through focused capabilities: A multiple case study”, Journal of Business Research 73 (2017) 65–82.

Crossan, M.M., and Apaydin, M.
2010
"A Multi-Dimensional Framework of Organizational Innovation: A Systematic Review of the Literature," Journal of Management Studies (47:6), pp. 1154-1191.

Doz, Y. L., & Kosonen, M.
2008
“The dynamics of strategic agility: Nokia's rollercoaster experience”. California Management Review, 50(3), 95–118.

Lyytinen, K., and Rose, G.M.
2003
"The Disruptive Nature of Information Technology Innovations: The Case of Internet Computing in Systems Development Organizations," MIS Quarterly (27:4), pp. 557-596.

Vaidya, Saurabh., Ambad, Prashant., Bhosle, Santosh.
2018
“Industry 4.0 – A Glimpse”, Procedia Manufacturing, Volume 20, pp. 233-238.

Xue, L., Ray, G., and Sambamurthy, V.
2012
"Efficiency or Innovation: How Do Industry Environments Moderate the Effects of Firms' IT Asset Portfolios?," MIS Quarterly (36:2), pp. 509-528.

FROM CUSTOMER NEEDS TO CUSTOMER SATISFACTION: THE FAST WAY

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Abstract

Purpose *– The paper aims to introduce readers to the Function Analysis System Technique (FAST) and a new conceptual framework, which can be used for continuous product improvements that meet customer needs identified throughout marketing research.*

Methodology/approach *– Throughout literature research we analyzed the main characteristics of the Function Analysis System Technique (FAST), aiming to present the benefits of its application for transforming customer needs data in improved or new products.*

Findings *– The FAST Diagram is a well-known functional structure representation of a system (product or service) used in its early design process and can generate creative solutions independent of a specific implementation.*

Research limitations/implications *– We provided general information and characteristics of our conceptual framework acknowledging that further research could be done towards its application in a company for creating a more refined version.*

Practical implications *– Our conceptual framework and condensed information of the main characteristics for the Function Analysis System Technique (FAST) could be used as valuable information for management decisions concerning product improvements.*

Originality/value *– We analyzed the main characteristics of the Function Analysis System Technique (FAST) an integrated it in a conceptual framework, making it easier to understand the transition from customer need to customer satisfaction.*

Key words: *customer needs, value analysis, FAST diagram, customer satisfaction.*

Introduction

The role of marketing research to identify and understand customer needs for developing improved products and services concepts is obvious, and even more obvious is that it contributes to an increased customer satisfaction and retention rate.

Practitioners and researchers developed various means, ways, methodologies and techniques to identify customer needs, gathered from the voice of consumer (VOC), this resulting in a new wave of terms to define customer needs: wants and wishes (Aguwa et al., 2012 and Abramov, 2015), expectations (Egboro, 2015), product attributes (Brakus et al., 2014), customer request (Peng et al., 2012) and requirements (Park and Lee, 2011, Li et al., 2014 and Zheng et al., 2016).

Regardless of the practitioners' or researchers' ways of defining customer needs, a critical mission for company managers, market researchers or product engineers and innovators, is to identify and use them to develop improved products or services, meant to achieve customer satisfaction.

Nevertheless, customer satisfaction can be defined as a measure of how products or services delivered by a company meet or surpass a certain customer need. Form this point of view, a customer acquires a product or service, because of the benefits that he receives for the amount he paid. Thus, the benefit has a value for the customer and could be functional, tangible, intangible or even

emotional. To meet or exceed customer needs, companies must deliver a certain benefit combination for the specific market sector.

In this line of reasoning, we consider that identifying customer's need, from the voice of consumer (VOC), is not sufficient to achieve customer satisfaction. A company must find the successful combination of benefits (functional, tangible, intangible or emotional) for a given customer need and a way to integrate all of them, in the improved product or service, thus creating value.

SAVE International® (Society of American Value Engineers) states that, product value must be understood as the relationship between functions and resources, where functions are measured by the reliable performance to meet customer needs and resources are measured in costs needed to perform the functions (Value Methodology Glossary, 2017). Research conducted by Ibusuki and Kaminski (2007) shows the importance of product value analysis principles, to achieve product value improvement, resulting in more benefits for its customers and subsequently company profits. Mostafaeipour (2016), presented a case study of 14 creative ideas resulted from implementing product value analysis and how the best solution may lead to cost savings and product improvement.

Thus, our conceptual framework design is based on three conclusions brought together from literature review:

- Companies need quick and feasible ways to collect meaningful information regarding customer needs and integrate them in a decision supporting tool (Park and Lee, 2011), thus identifying major customer needs, evaluating and prioritizing them can help the improvement process team to generate ideas for improving the existing product, leading to customer satisfaction and high retention rate (Peng et al., 2012 and Aguwa et al., 2012).
- Harvesting data from the VOC can help organizations to set future product or service improvement targets (Li et al., 2014), thus in today's highly competitive market environment, integrating the VOC in the improvement process represents a critical mission for the company's competitiveness growth (Egboro, 2015).
- Data form the VOC can be easily harvested throughout various methodologies and techniques, however creating the optimal benefit combination for a specific customer need and integrating it in the product improvement process can be difficult, due to customers' needs heterogeneity and fluctuation (Zheng et al., 2016) and the companies' focus on technical features improvements, bypassing customers' need emphasis on sensory or emotional features (Brakus et al., 2014 and Abramov, 2015);

The Function Analysis System Technique (FAST) Diagram

The Function Analysis System Technique (FAST) Diagram is a graphical representation of the set of product's functions (Borza, 2011) and encourages product improvement teams (with different backgrounds) to generate creative solutions (Baytheway, 2007) for a product improvement process that requires interdisciplinary knowledge (Baytheway, 2012).

Using the principles of Value Analysis, a product function is defined in a verb-noun format (Value Methodology Standard, 2015) and each member can contribute (based on their background) with a wide variety of approaches and solutions for the product improvement process.

Figure 1 presents the bidirectional graphical orientation of the FAST Diagram, meaning that the horizontal orientation represents the HOW – WHY function decomposing logic, while the vertical orientation represents the WHEN function decomposing logic:

- The team members ask from left to right HOW a function is performed (a specific approach for the function) and form right to left WHY is that function performed (conceptualizing the function to a higher level);
- The team members ask WHEN a function is performed, to indicate the causes and effects (supplementing creative thinking) and not time orientation (like in the case of a workflow diagram).

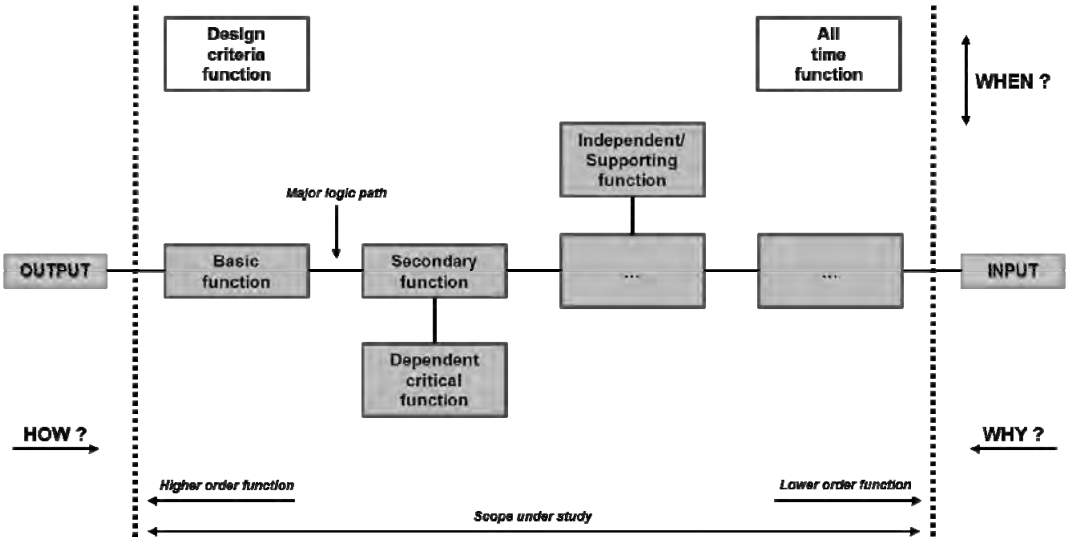

Figure 1. The classical FAST Diagram (adaptation after Borza, 2011)

The scope of the FAST Diagram is the "higher order function" (output), located to the left of the Basic Function and outside the left scope line. The functions to the right and outside of the right scope line represent the "lower order function" (input) and initiate the subject under study, thus each type of function has a specific roll in determining the full set of product functions (Borza, 2011 and De Saint and Paixão-Barradas, 2017):

- The Basic Function describes the essential technical functionalities of the product and can exist independently of other function, justifying what the product was designed to do;
- The Secondary Function describes the set of additional functionalities resulted from the specific approach to achieve the basic function and can be sub-divided as follows:
    - Dependent Critical Function – which must occur for the Basic Functions to be performed;
    - Independent/Supporting Function – which help the basic functions to be performed better, faster, longer etc.;
    - Design Criteria Function – which are performance requirements applicable to the overall product;
    - All-Time-Functions – which are broad requirements and assumed by the customers to be performed by the product.

The FAST WAY from customer need to customer satisfaction: conceptual framework

From our point of view, the Function Analysis System Technique (FAST) can act as a link between customer need and customer satisfaction, because of its "HOW–WHY–WHEN" logic that helps to describe the product in functions, allowing for a more creative thinking throughout the product improvement process. Also, this approach gives the product improvement team an opportunity to compare the current product concept (based on its life cycle) with various improved versions or completely new product concepts, that can satisfy the customer's needs, thus creating a new mix of benefits (or added value) for the customer.

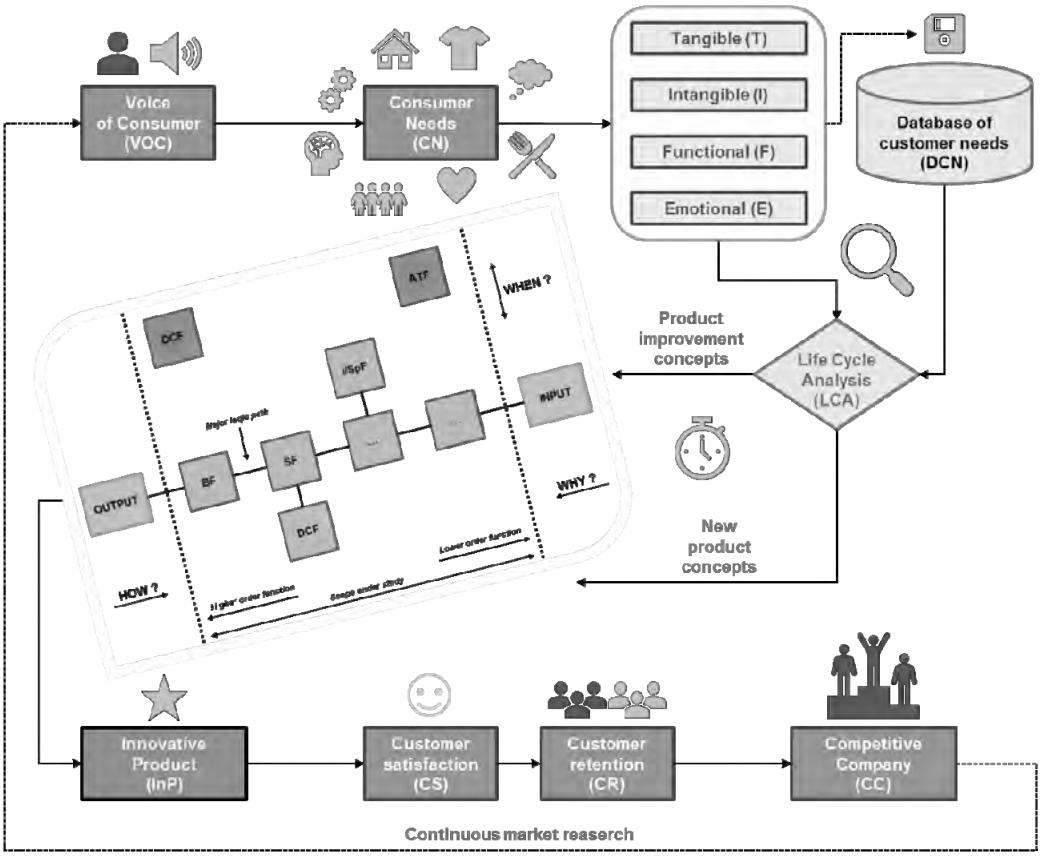

Figure 2. The FAST WAY conceptual framework

Figure 2 presents the FAST WAY conceptual framework and represents the flow of activities for integrating the Function Analysis System Technique (FAST) in the process of analyzing the information gathered form the voice of consumer (VOC), organizing customer needs (CN) in categories and transforming them in product function (using the verb-noun format), that can result in an innovative product (InP), meant to satisfy customer needs (CN), obtain a high customer retention (CR) rate and assure a high level of competitiveness for the company in its market sector.

The core purpose of the conceptual framework is to improve the company's product improvement process by using the FAST Diagram to generate a various set of creative solutions for the product.

The FAST Diagram aids in thinking about the product improvement process objectively (in terms of product functions) and enables the improvement team to compare and identify all product functions and verify is some of them (in the actual product concept) are unnecessary or missing.

For this to occur, a database of old customer needs (earlier market researches) must be investigated and compared to the current customer needs, that eventually will be stored for future comparisons and product improvement processes.

Based on a simple life cycle analysis (LCA) and the earlier customer needs investigation, the product improvement team can give a straight forward answer to the following question: "Dose the actual product concept still satisfies customer's needs in its life cycle stage?" If YES, the product will undergo in an improvement process to optimize its functions and if NO, the actual product concept will be subjected for creating a brand-new product concept that will satisfy the actual customer needs, thus creating the input for the FAST Diagram.

The benefit or main advantage of integrating the FAST Diagram in this conceptual framework, is that there are no good or bad FAST Diagrams. After generating various creative improvement and product concepts the team must reach a consensus for the product's functions. Only after this stage the product improvement team can act upon optimizing the product's appearance from a tangible (T), intangible (I), functional (F) and emotional (E) point of view.

Thus, the output of the FAST Diagram can be transformed into the innovative product (InP) meant to obtain customer satisfaction (CS), increase customer retention (CR) rate and assure the company's competitive (CC) advantage in its market place. To maintain its competitive advantage, a company must take into consideration a continuous market research, that will help it to cope with the customers' needs heterogeneity and fluctuations.

Discussion and conclusions

The methodology of implementing a product improvement process can vary form one company to another. Regardless of the methods, tools, practices or actions used, it is certain that every company manager needs to use a quick and feasible combination of procedures to assure its competitive advantage.

Our research contributes to the theoretical understanding for the basic characteristic and advantages of using FAST diagrams, while the conceptual framework is focused on the way a company should integrate it in the product improvement process.

The FAST WAY conceptual framework has its limitations because it is only in its theoretical stage and not yet applied in a company. However, as mentioned in past studies, the importance of Value Analysis is critical and has known advantages for the product improvement process and the company's competitive advantage (Miclea et al., 2018). Thus, further research is required and intended towards its application in an automotive company for creating a more refined version of its activities and processes.

References

Abramov, O.
2015
"Voice of the Product to supplement Voice of the Customer." Proceedings of the 11th TRIZfest-2015 International Conference, 10-12th September, Seoul, South Korea, 309-317.

Aguwa, C. C., Monplaisir, L., and Turgut, O.
2012
"Voice of the customer: Customer satisfaction ratio based analysis." Expert Systems with Applications, Vol. 39(11): 10112-10119.

Borza, J. S.
2011
"FAST diagrams: The foundation for Creating Effective Function Models.", Proceedings of 13th Annual International Conference TRIZCON, 28-29th November, Detroit, USA, available at: https://www.aitriz.org/documents/TRIZCON/Proceedings/2011-06_FAST-Diagrams-The-Foundation-for-Creating-Effective-Function-Models.pdf, accessed on 10.05.2018

Brakus, J. J., Schmitt, B. H., and Zhang, S.
2014
"Experiential product attributes and preferences for new products: The role of processing fluency." Journal of Business Research, Vol. 67(11): 2291-2298.

Bytheway, C.W.
2007
Fast Creativity at Innovation: Rapidly Improving Processes, Product Development and Solving Complex Problems. Plantation, FL, USA: J. Ross Publishing-Inc.

Bytheway, J.
2012
"Finding Hidden Functions in FAST Diagrams Using Reserve How." Save International Value World, Vol. 35(2): 3-9.

De Saint, J. O., and Paixão-Barradas, S.
2017
"FasTDesign Diagram: a new engineering design model based on technical and design functionalities of the innovative product." International Journal of Quality Engineering and Technology, Vol. 8(1): 318-324.

Egboro, F.
2015
"Marketing challenges of satisfying consumers changing expectations and preferences in a competitive market." International Journal of Marketing Studies, Vol. 7(5): 41-52.

Ibusuki, U., and Kaminski, P. C.
2007
“Product development process with focus on value engineering and target-costing: A case study in an automotive company.” International Journal of Production Economics, Vol. 105: 459-474.
Li, L., Liu, F., and Li, C.
2014
“Customer satisfaction evaluation method for customized product development using Entropy weight and Analytic Hierarchy Process.” Computers & Industrial Engineering, Vol. 77: 80-87.
Miclea, Ș., Pugna, A., Negrea, R, and Potra S.
2018
“A New Approach for Assessing Function-Cost Correlation in Product Value Analysis.” Procedia - Social and Behavioral Sciences, Vol. 238: 133-140.
Mostafaeipour, A.
2016
“A Novel Innovative Design Improvement Using Value Engineering Technique: A Case Study.” Journal of Optimization in Industrial Engineering, Vol. 19: 25-36.
Park, Y., and Lee, S.
2011
“How to design and utilize online customer center to support new product concept generation.” Expert Systems with Applications, Vol. 38(8): 10638-10647.
Peng, W., Sun, T., Revankar, S., and Li, T.
2012
“Mining the voice of the customer for business prioritization.” ACM Transactions on Intelligent Systems and Technology (TIST), Vol. 3(2): Article 38, 17 pages.
SAVE International®
2017
“Value Methodology Glossary.”, Society of American Value Engineers, available at https://www.value-eng.org/page/Standard_Documents, accessed on 07.05.2018
Zheng, P., Xu, X., and Xie, S. Q.
2016
“A weighted interval rough number based method to determine relative importance ratings of customer requirements in QFD product planning.” Journal of Intelligent Manufacturing, 1-14.

KNOWLEDGE TRANSFER FOR RENEWABLE ENERGY PROJECTS

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Abstract

Purpose *– The present paper identifies the importance of knowledge transfer between key players involved in managing a RES project.*

Methodology/approach *- The research tool used is the questionnaire, addressing questions both the developer of the RES project and project manager. The questionnaire contains questions and is built using a Likert scale. The structured model is improved based on methodology Win-Win and Clarity of Communication (WWCC), strategy build on the Theory of Constraints Thinking Process (TOCTP). The example provided in the paper through Future Reality Tree is a generic framework capable of providing solutions for improving the knowledge transfer in RES projects.*

Findings *– This paper indicates a framework to facilitates knowledge sharing for future project managers that are preparing to enter in the RES sector.*

Research limitations/implications *– Investments in renewable energy projects have a major impact in the current economy in such way that can achieve finding alternative solutions that correspond to the responsibilities assumed in such kind of projects.*

Practical implications *– The primary objective of the paper is to motivate students in energy topics related to renewable sources according to the economic realities.*

Originality/value *– The paper promotes knowledge sharing and information exchange between key players in renewable energy supply that can add value to engineering education and training.*

Key words: *renewable energy, knowledge transfer, PMO*

Introduction

Global warming, carbon dioxide emissions, fuel burning, exploitation of fossil fuels are important harmful factors which has cause environmental issues lately around the globe. Since the present talks on environmental issues are top of the list in any international debate, the responsibility of each country is to reduce energy consumption and use as much as possible renewable energy resources (RES). (Zamfir, 2011) (Karabulut, et al. 2011) Awareness about what beneficial effects has renewable energy exploitation need to be transferred in the first phase from experts in the field. (Byrne, et al. 2007) Acknowledgement this fact has empowered project developers to invest in renewable energy projects in developing countries with considerable potential for green energy. (Jennings, 2009) In this sense the new challenges offered by implementing projects in renewable energy must empower practitioners in the field to stay up to date with all the specialized information. (Rogers, 2008) Although the implementation of renewable energy projects offers superior characteristics on green energy, complexity of implementing these projects require a set of specific knowledge in administrative, technical, technological, financial and even promotion and social responsibility fields. RES specialists are the ones who convey knowledge through research communities, educational programs or training workshops. (El Fadel, et al 2013) Through knowledge transfer specialists in RES projects offer the best quality information, respective they leverage their individual knowledge when implementing a new project. (Vie, 2012) Experts in the field of RES are directly involved in finding the best solutions for the problems that come into contact in daily life. In this way they are engaging the RES research in

observing the issue and finding feasible alternatives to implement and finalise the project in time. Moreover, all aspects of RES projects life cycles include higher complexity, involves greater demand on the capabilities of project managers and project team that need to possess appropriate knowledge and experience.

A RES expert / specialist is the person who has a comprehensive and authoritative knowledge or skill in a particular area. For example, *project managers (PM) in RES,* need to have knowledge to supervises the construction of the wind plant from site selection to final turbine installation. They are also involved with the contractual bidding of projects and business development for the company as a whole. They need to know relevant data for budgeting, site selection, site studies, permitting processes and safety policies to construction and transportation of wind turbines. A PM in RES oversee the work plan, staffing, and budgeting for each phase of project execution, including design, engineering, procurement and construction, and arrange for recruitment or assignment of project personnel. Also base on a good expertise they have to focus on what cranes can operate due to high winds, geotechnical constraints on foundation types, and soil properties for cable and trenching operations. Depending the complexity of some wind plants, project managers may manage portions of the construction, such as site clearing, foundation construction, or tower erection. Most of the responsibilities that a project manager in RES has are critical for the entire project implementation. The vast knowledge that the PM has need to be transferred to the members of RES project so that an optimal collaboration is achieved during the entire project:

- Managing planning construction and applications
- Obtaining planning consent and making amendments
- Environmental compliance and liaising with planning authorities
- Planning studies
- Stakeholder management
- Developing onshore wind farm projects, as well as other renewable energy plants
- Landowner negotiations
- Negotiating with stakeholders
- Regular reporting and project updates
- Budget management

For all these activities is very important to work in partnership with development department to assure the construction phase and coordinate with the legal department to facilitate the development, negotiation and project contracts execution.

Some activities from the RES project that need an expertise and they are not in the area of project manager it is up to business analysts to exchange the knowledge for a good collaboration. Within the RES project they have different objectives, but not mutually exclusive. It is obvious that in theory the project manager can define all activities and can develop estimates for the whole project, but this is not possible in practice. (Barry et al. 2011) Many wise project managers have learned that their lives become easier when they receive contributions from the resources that actually complete the work. (Larson and Larson, 2010) Assuming an ideal situation business analysts and project managers can work together to get better results and better business outcomes. They can collaborate at each stage of a project, from project management and project planning to implementation. Also, both can coordinate tasks to improve communication, reduce risks, engage stakeholders and respond more effectively to changing demands. (Popaitoon and Siengthai, 2014)

In this paper the research team highlights knowledge transferred by the project manager to the project team. In this sense there are 4 major knowledge categories that are important for the implementation of each RES project, respectively administrative, technical, technological and financial. These categories are presented in Table 1.

Table 1: Knowledge in RES project

Nr.crt	Knowledge in RES project	Activities to implement
1.	Administrative	-Identifying possible efficiency improvements before a project begins -Establishing site design and locations -The process of obtaining necessary permits and approvals is laborious and time-consuming and construction works sometimes can be atypical, hampered by placement location without power supply and water. Weather conditions also can influence the development work in the field -Following installation best practices, code requirements, and utility guidelines - Developing a project plan, which includes defining project goals, how task and objectives will be achieved
2.	Technical	-Transportation and on-site assembling and installation -Finding supplier that provides quality raw materials, - Manufacturing of mechanical components -Fabrication design, -Test of electronic devices
3.	Technological	-Diversification and simplification of the equipping, multiple usages of the components - It can be difficult finding companies that have the ability to achieve some different materials elements of high precision.
4.	Financial	-The necessary financial funds, various reorganizations and restructurings are necessary to complete the project in time and achieve the desired goals. -The analysis and research of the cost reduction possibilities -What resources are need, and associating budgets and timelines for completion, implementing the project plan, and ensure that the plan is being managed according to the project. -Project managers interpret project financial reports and prepare cash flow forecasts. They report this information to upper management and use it to determine potential impacts to the project budget.

After presenting the knowledge categories necessary for the implementation of RES projects the research team has developed a conceptual model in which these categories are the reference center for the project manager's expertise in transferring the most optimal information to departments with which he collaborates in the project.

Conceptual Model

This research focused on investigating the implementation of RES projects in the Western Region of Romania. The projects were funded from European Union Structural Funds.

Knowledge transfer designed in the model is influenced by three types of motivational factors: communication, collaboration and absorption capacity and four types of expertise. Knowledge is presented at 3 levels: individual, organisational and group.

The need for a complex knowledge transfer at the administrative level, technical level technological level and financial level of RES projects, constitute prerequisites for success in projects implementation of this type. Knowledge transfer enables project team members to reduce rework and squeezes the time that it takes to plan project execution. Additionally, providing the right knowledge to the right person at the right time allows for better power over the project during the project’s lifecycle.

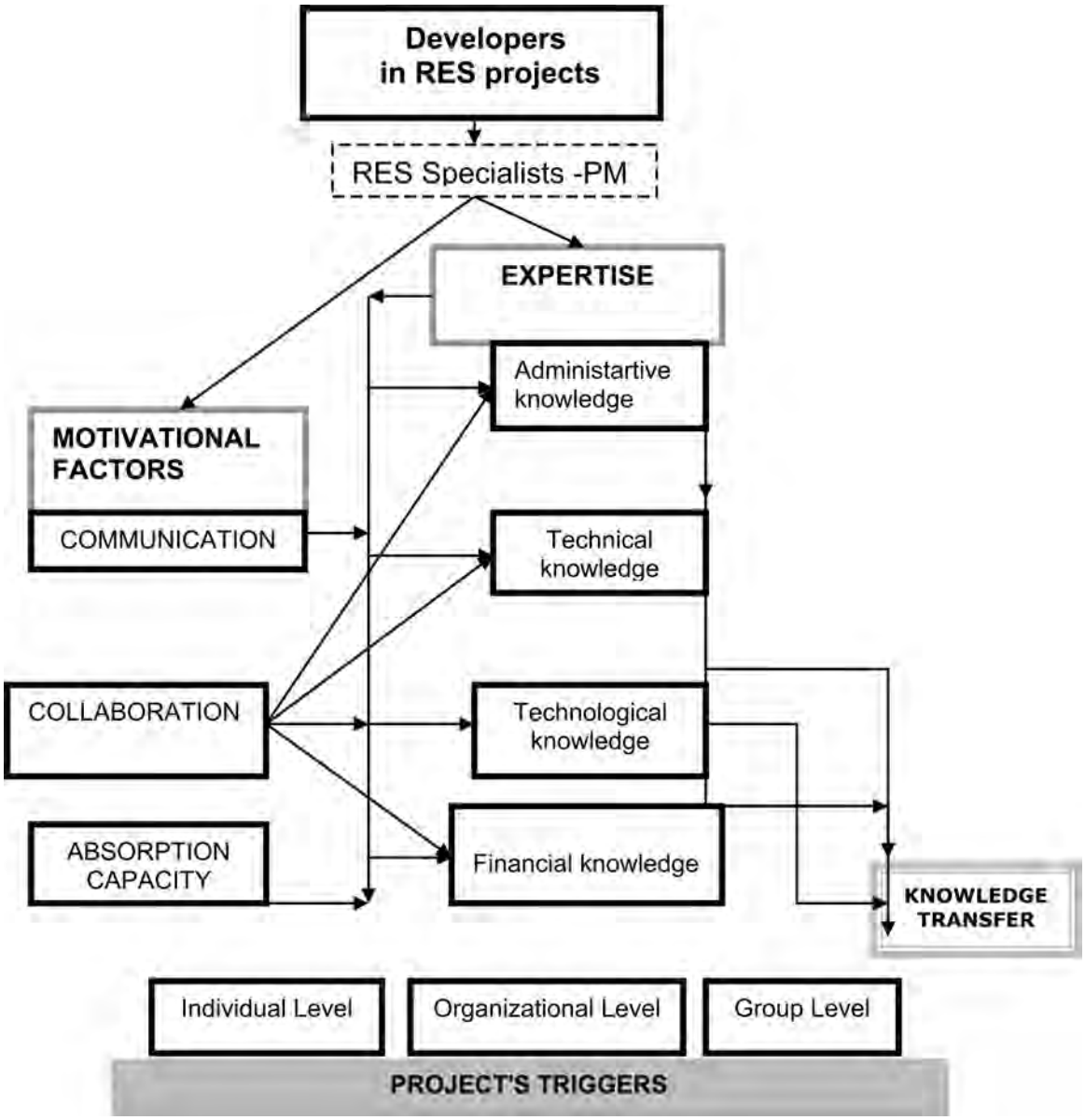

Figure 1. Conceptual model

In this research it is presented the individual level. Also, there are presented Indicators, component variables and operating hypotheses. In order to test the model and the operation assumptions, investigative tools were developed in the form of questionnaire pairs addressed to both developers (sources) and project managers (receptors). These were administered directly, by interviewing those involved, or by e-mail.

Development of the research tool

The research tool used is the questionnaire presented to both the developer and the project manager. The questionnaire contains closed and open questions and is built using a 5-point Likert scale as follows:

Table 2. Likert Scale

Always	Very often	Sometimes	Rarely	Never
5	4	3	2	1

The 50 questions, of which 25 are addressed to the developer and 25 are addressed to the project manager. The questions have been formulated to reach all levels of expertise in the implementation of a RES project. In the research paper are exemplified some questions as follows:

Q 1: Do you think that transferring the knowledge to others is an essential key for a good collaboration?

Q 2: When the project is implemented, it business lacks staff with the required technical expertise and business expertise to sustain the initiative?

Q 3: When exchange information with technological team, how often they implement the solutions in time?

Q 4: How often the suppliers are collaborating without delays when it comes to shifting the piece?

After the data were collected the research team propose the solution that to improve the knowledge transfer it is necessary to develop a Project Management Office (PMO) for RES projects. The role of PMO is to create a repository of lessons learned, and a review of such repository should be part of a new problem induction process. When there is no proper repository of lessons learned within the project, searching for solutions can be time consuming.

Project Management Office (PMO) for RES projects

The need to implement a PMO for RES projects can serve as a protection for reporting. It can present standards to an otherwise disruptive project or program management group. It can also lead the way in introducing new goals and practices. (McDonald and Janis, 2012). More specifically the PMO can be a project coach model. This model assumes a willingness to share some project management practices across business functions and uses the project office to coordinate the knowledge. For RES project, especially in developing countries can offer an advantage to document best practices and share the performance, actively. The PMO in RES project is a permanent structure with staff and has some supervisory responsibility for all projects. Utilities should ensure that PMOs clearly communicate the value of knowledge transfer, the importance of succession planning conducted through mentoring, and the very fact that training is available and encouraged. PMOs need to make sure they place equal importance on hard and soft skills, such as leadership and critical thinking, for training and development in order to have a positive influence on career progression. (Spalek, 2014)

To exemplify the knowledge transfer in RES project the research team is using the methodology Win-Win and Clarity of Communication (WWCC), strategy build on the Theory of Constraints Thinking Process (TOCTP). (Goldratt, and Cox, 1984). In order to underline the effectiveness in obtaining and implementing the right solutions along the lifecycle of RES projects the research team have diagnosing problems, designing the solutions, and integrating the solutions into the conceptual model. In this sense the method supposes diagrams development from the 3 stages of the TOCTP method *What to change? What to change to? How to make the change happen?* The research team present in this paper only the Future Reality Tree (FRT) which gives the suggestive result of the knowledge transfer extracted from the conceptual model.

The example provided in the paper through FRT is a generic framework capable of providing solutions for improving the knowledge transfer in RES projects. FRT express possible alternative solutions, through the "penetration" of so-called "injection". In principle, the injection is the central problem solution and a strategy that will merge and mitigate any undesirable effects (UDE), making them the desired effect (DE). One purpose of FRT is to validate that the solutions or strategies identified will achieve the desired effects (DEs) and, respectively, the desired outcomes (DOs). Configuring FRT is achieved as follows: start by replacing undesirable effects (UDEs) with the desired effects (DEs). DEs are placed in the boxes in the top of the FRT. In the bottom of the FRT the assumptions are placed together with necessary injections (solution or solving strategies). The idea here is to get a picture of how an injection (a breakthrough) might affect the overall performance of the system. The FRT is the validation that a collection of injections will turn all of the UDEs into DEs. (Goldratt, and Fox, 1988)

More specifically it was considered a research and development project in order to design some wind blades in isolated regime, configured for different geographical areas (hill and mountain locations in Romania). alternative solutions based on TOCTP, through which feasible technical solutions have been transferred to project manager in order to achieve adequate functionality of the RES project.

Specifically, it has been analyzed important criteria of blades performance, suitable for isolated region, the blades being identified to meet the unique technical parameters, adaptable to wind turbine power.

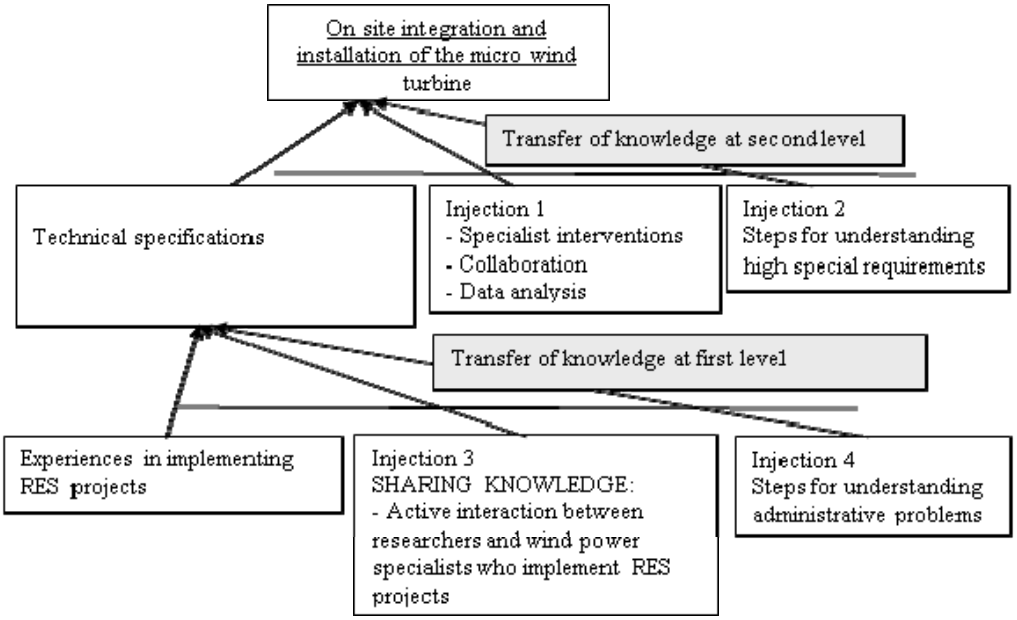

Figure 2 Future Reality Tree

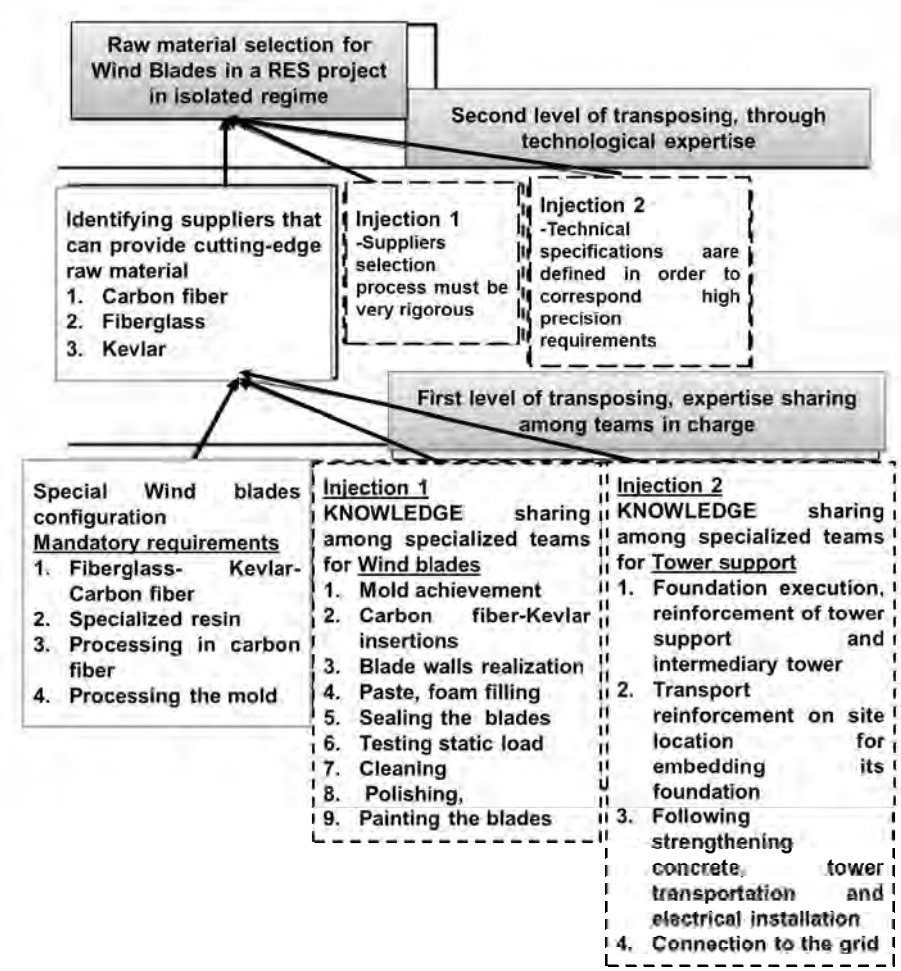

Figure 3 Future Reality Tree – knowledge transfer exemplification

Discussion and conclusions

The implementation of RES project requires the expertise at different level, namely specialized knowledge in administrative, technical, technological, financial and even promotion and social responsibility fields. Without this corelating this knowledge the RES project is predictable to delay.

The paper highlights the role of the project manager in RES project and explain how a structured model for transferring knowledge can be put into a mechanism with lessons learned. Exactly explain at the beginning of the RES project, project managers request assistance of a PMO. In this sense he is engaging more responsible for each activity in the project because knows in advance what will be the steps that require greater efforts to achieve the tasks.

The conceptual model structured by the FRT conceived, presented and exemplified in the paper is a generic framework capable of providing solutions for improving the knowledge transfer in RES projects.

References

Barry, M. L., Steyn, H., & Brent, A.
2011
Selection of renewable energy technologies for Africa: Eight case studies in Rwanda, Tanzania and Malawi. Renewable Energy, 36(11), 2845-2852.

Byrne, J., Zhou, A., Shen, B., & Hughes, K.
2007
Evaluating the potential of small-scale renewable energy options to meet rural livelihoods needs: A GIS-and lifecycle cost-based assessment of Western China's options. Energy policy, 35(8), 4391-4401.

El Fadel, M., Rachid, G., El-Samra, R., Boutros, G. B., & Hashisho, J.
2013
Knowledge management mapping and gap analysis in renewable energy: Towards a sustainable framework in developing countries. Renewable and sustainable energy reviews, 20, 576-584.

Goldratt, E. M., and Cox, J.
1984
The Goal, North River Press, Inc., Croton-on-Hudson, NY.

Goldratt, E. M., and Fox, R. E.
1988
The Theory of Constraints Journal, Volume 1, Number 3, Avrakm Y. Goldratt Institute, New Haven, CT., August/September.

Jennings P.
2009
New directions in renewable energy education, Renewable Energy 34 pp. 435–439

Karabulut A., Gedik E., Keçebas A.¸ Alkan M. A.
2011
An investigation on renewable energy education at the university level in Turkey, Renewable Energy 36 1293-1297

Larson, E. & Larson, R.
2010
Project manager and business analyst: are they one or two roles? Paper presented at PMI® Global Congress 2010—North America, Washington, DC. Newtown Square, PA: Project Management Institute.

McDonald, K. T. & Janis, M.
2012
Green means go!: Building sustainability into the PMO. Paper presented at PMI® Global Congress 2012—EMEA, Marsailles, France. Newtown Square, PA: Project Management Institute.

Popaitoon, S., & Siengthai, S.
2014
The moderating effect of human resource management practices on the relationship between knowledge absorptive capacity and project performance in project-oriented companies. International Journal of Project Management, 32(6), 908-920.

Rogers, J., Simmons, E., Convery, I. and Weatherall, A.
2008
Public perceptions of opportunities for community-based renewable energy projects. Energy Policy, 36 (11). pp. 4217-4226. Downloaded from: http://insight.cumbria.ac.uk/id/eprint/132/
Spalek, S.
2014
How to facilitate the knowledge transfer. Paper presented at PMI® Global Congress 2014—EMEA, Dubai, United Arab Emirates. Newtown Square, PA: Project Management Institute.
Vie Edvin Ola
2012
The need for knowledge integration in renewable energy innovation projects, Technoport RERC Research 2012, Energy Procedia 20 pp. 364 – 376
Zamfir, Al.
2011
Management of renewable energy and regional development: European experiences and steps forward, Theoretical and Empirical Researches in Urban Management, 6 (3) pp. 35–42

MANAGEMENT OF READING PROCESS AND DATA PROCESSING ON GAS CONSUMPTION

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Abstract

Purpose *– This paper wants to present the current status of the reading process and data processing on gas consumption and to present some methods that involves implementing a new performance management system for the mentioned processes.*

Methodology/approach *– Implementing a new performance management system involves knowing the current system and application methods. For a better knowledge of the processes during the year 2016 within Delgaz Grid, Maramures county, i studied the methods of reading and processing data on gas consumption. I also studied how the data are processed.*

Findings *– The common problems encountered by meter readers are:*

Lack of access to the counter (especially in the area of houses where the meters are not installed at the property limit).

Height meter (especially in the house area).

Missing meter counter (in this case the investigative team is announced to investigate a possible fraud).

Missing counter (in this case the investigative team and the police are announced to investigate fraud or theft, as the case may be).

The common problems that data process has, it is that during the transfer between meter readers and local manager, there are some synchronization problems, also when the manual reading list is synchronized there also appears nonconformities.

Research limitations/implications *– The biggest issues regarding the transparency of the gas consumption billing process are related to data reading and data processing which requires the introduction of a new management system for the above mentioned process.*

Practical implications *– To implement a new performance management system. must also take into account the prevention of frauds, starting from the theoretical study on the modernization of the gas meter reading system with the help of GPRS connections, adapting the measuring devices at the current technological level by installing sensors: mechanical limitation, pressure sensor, infrared sensor, Pressure transducer, optical sensor.*

Originality/value *– The need to introduce a performance management system is vital to the optimal development of an organization. In my study, the need to meet the client together with the need for efficient development of the organization must be combined to archive the most effective results.*

Key words: *Management, Optimization, Gas.*

Introduction

Every organization / company is unique, it has its own identity and organization, so although each organization has a management system based on the four main elements:

- management policy and objectives, being the guide of the organization
- management responsibilities, defined so that each person involved knows the needs and requirements of the job they occupy

- defining processes that establishes people's ties to the organization's goals

distribute and analyze data (documents and records) so as to ensure the performance improvement of the organization [Oprean. C, Kifor C.V. and Alexe C., 2012], there can not be two similar management systems !

Because:

- each organization / company must develop its own Management System so that it can be continuously used and improved
- management systems can not be purchased as a shelf-based product, can not be downloaded from any specialized site and can not be created exclusively through the contribution of a consultant - each organization must develop its own Management System, benefiting more than once the professional services of a consultant.[ISO 9001, 2017]

Case study

To implement a new performance management system I need to find how it is the situation, and I started with the study of the current way that reading process was/is performed within DelgazGrid S.A. and it was reported at the level of 2016, within the Maramures county.

Reading the meters at home subscribers is done quarterly, at which time the invoice appears on the type of readout: "regularization," in the rest of the invoice period may appear in the type of readout: "estimation" or "self reading".

The estimation is based on the average consumption in the same period of the last three years, the self read is done individually by each subscriber within 7 days, the interval communicated at the time of the change of the type of contract by the agent from the customer relations, the introduction the meter index can be done online or by phone.

The approximate number of counters in 2016, at the level of Maramures County, was 78,200, the number of readers (readers) was 9 persons. Readers are assigned according to the type of area where they have read: rural, urban apartments or urban area of houses, the reading unit.

- a reading unit for rural areas is about 100 houses / day / reader,
- in urban areas - houses a reading unit is about 150 houses / day / reader,
- in urban areas - apartments a reading unit is about 450 apartments / day / reader.
- more "special" treatment is given by large consumers, with about 1250 counters, which are read monthly in the last 3 working days of calendar months.

Readers who have read apparatus is automatically synchronized with a server after entering the readings basically scans the bar code reader of the meter, the meter bar code corresponds to the point of consumption - the place where the meter is mounted. One of the main problems is whether the reader is mistaken about reading, that is, misinterpreting the reader from the meter's mechanism, can not correct the mistake on the spot, only at the headquarters, is a person who has the right to administer the application - modifying the read. [Stoica.A, 2011]

Common problems encountered by meter readers are:

- lack of access to the counter (especially in the area of houses where the meters are not installed at the property limit)
- height meter (especially in the house area)
- missing meter counter (in this case the investigative team is announced to investigate a possible fraud)
- missing counters (in this case the investigative team and the police are announced to investigate fraud or theft, as the case may be)

In order to modernize the data processing process, we need to know how data is currently being processed, processed and synchronized, current data importing and exporting methods from SAP (enterprise resource planning software that uses common databases maintained by a database

management system. The system tracks business resources: cash, raw materials, production capacity, and business engagements status: orders, purchase orders, and The applications that make up the system's shared data in different departments: production, purchasing, sales, accounting, management, etc., which provide the data), have to be known, allocation of data to the service provider (reading counters in our case), how to approach unread counters and generate work reports.[SAP, 2018]

The common problems that data process has, it is that during the transfer between gas meter readers and local manager, there are some synchronization problems, also when the manual reading list is synchronized there also appears nonconformities.

Following the identification of the current processing - data processing mode, it was taken into account that for the introduction of a data processing - data processing requires a new application, an application that allows the import of SAP data from the MyLine application and allow automatic identification anomalies (out-of-date conditions that can be identified at the place of consumption and which in some cases may lead to the impossibility of reading).

For an overview of the proposed application, some of the most important elements to consider are:

- - using mobile terminals, field equipment collects and records consumption in the application, at each read meter the terminal takes a picture to check possible anomalies and possible corrections.
- - after making field readings and downloading data, they may be subjected to a validation process. The validation process involves individual validation of the
  - reading results by comparing the read index with that of the associated photograph of the selected consumption point.
- - readers will be able to check and correct readings using application validation module.
- - after the corrections have been completed, the result of the readings will be exported to the system automatic billing.

Identify current fraud methods

During the verification of the maintenance and operation of the distribution system, various types of fraudulent consumption were identified:

- by avoiding the adjustment and measurement system
- by intervention on the means of measurement

Avoiding the measuring system is done by directly connecting the installation facility to the meter, installing a bypass instead of the measuring device or replacing the legal meter with an illegal one. "Double connection", flexible connection connected to the regulator

Intervention on the measuring apparatus can be done by:

- damage to or replacement of the recorder mechanism, drill integrator mechanism
- blocking the recorder mechanism by various methods: with a film of hard plastic
- perforation of the outlet of the measuring chamber of the measuring apparatus
- violating the seal and metrology marks of the measuring instrument
- reverse mounting of the measuring device (turned face to face)

Fraud Consumption Management

According to the ANRE decision no. 309 of March 30, 2005, republished in the Official Gazette no. 598 of August 11, 2008, regarding the general conditions for the contracting of gas distribution services, Chapter 5, Article 2, The level of damages is calculated at the maximum flow rate installed for 24 hours, for a period of 3 months, at the time of fraudulent use. [ANRE, 2018]

The internal procedure of Delgaz Grid says that when the Energy Inspector discovered the fraud (one of those mentioned in chapter 3.1), the competent bodies - Police, for the detection and drafting of the theft report - are announced and expected on the spot.

Consumers identified as having fraudulent use have 45 days to accept Delgaz Grid's amicable conciliation offer, otherwise within 3 months of identifying fraud, a criminal complaint is filed with the police to recover the damage to the civil court and the prosecution of the consumer.

Conclusions and future research directions

In order to prevent fraud in the case of the measuring mechanism, it is necessary to install a mechanical limiter, a limiter, to be fitted between the housing of the measuring apparatus and the integrator mechanism of the apparatus. Also in the case of frauds regarding the metering mechanism of the meters a pressure sensor could be mounted in the place for the sealing screws of the mechanism.

In order to prevent frauds aimed at blocking the integrator mechanism by drilling the cover, it is necessary to use an infrared sensor, a sensor that is mounted between the mechanism and the plastic or glass cover of the mechanism.

To prevent fraud in avoiding the measurement system, a pressure transducer can be used to automatically detect the lack of pressure in the meter.

As a result of my research combining the information obtained with an integrated management system the organization can obtain :

- improving the accuracy and availability of information
- increases productivity and costs by removing paper in the read process
- increases visibility in the billing process
- generates savings of 5 - 20% in the meter reading process
- provides access to correct reading data at any time of the day.
- preventing possible frauds
- prevention of possible damage, loss of gas

References

Oprean. C, Kifor C.V. and Alexe C.
2012
Integrated Quality Management
Stoica, A,
2011
Course support - Measuring and control devices, gas measurement
ANRE
Technical specifications, www.anre.ro (seen at date of 25.07.2018)
Delgaz Grid
Internal procedure regarding Fraud consumption (seen at date of 10.05.2018)
ISO 9001, ISO 14001
www.iso.org (seen at date of 04.12.2017)
SAP
www.sap.com/romania (seen on date of 20.11.2018)

DOES ICT MATTER IN THE NEXUS BETWEEN INTERNATIONAL TRADE AND ECONOMIC PERFORMANCE?

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Abstract

Purpose *– To examine the relationship between international trade and economic performance with the roles of information and communication technologies (ICT)*

Methodology/approach *– Hansen (2000) panel threshold regression model is used to examine this objective in sixty countries from 2000 to 2016. Three proxies for ICT are fixed telephone subscriptions, mobile cellular subscriptions and secure internet servers.*

Findings *– The results show that there are threshold effects for all three ICT indicators in the relationship between international trade and economic performance. The effects of ICT are larger before the threshold and become smaller after the threshold.*

Research limitations/implications *– Sixty countries are being randomly selected based on the rule with complete data from 2000 to 2016. Future analysis could include more countries and perform the analysis based on sub-regional countries because the influence of ICT in the relationship between international trade and economic performance might be different across regions.*

Practical implications *– To boost up the international trade in improving economic performance depends largely on ICT at the initial stage. Later, the roles of ICT are to assist international trade to maintain at a sustainable level to influence economic performance.*

Originality/value *– A relatively new Hansen (2000) panel threshold regression model is employed to investigate the threshold effect of ICT in the relationship between international trade and economic performance in a large sample dataset with long period of sample study.*

Key words: *information and communication technologies, international trade, economic performance*

Introduction

It is widely acknowledged that trade is a contributing factor toward the promotion of economic performance had been proven by economists and policy makers for a long period (Mullings & Mahabir, 2018; Pradhan, Arvin, Hall, & Norman, 2017). Theoretically, international trade tends to improves economic performance by facilitating the diffusion of knowledge and technology, by allowing economies to better capture the potential gains from increasing returns to scale and exploit economies of specialization according to comparative advantage, and by creating incentives for governments to adopt more disciplined types of macroeconomic management and to develop better institutions under the pressures of international competition (Kim, Lin, & Suen, 2016; Sokolov-Mladenović, Milovančević & Mladenović, 2017).

Empirically, trade may encourage economic performance which had be proven by several researches and studies (Kim et al., 2016; Mullings & Mahabir, 2018; Pradhan et al., 2017). In general, most of the cross-country studies overwhelmingly prove a positive and statistically significant relationship between trade and performance. According to previous studies, trade may enhances economic performance by economies of scale, specializing in the export of goods and services in which they have a comparative advantage, efficient allocation of resources increase, faster rates of capital accumulation, technical progress get improve, knowledge acquisition, etc. where the dynamic gains from trade that constantly

shift countries' production possibility frontiers outward (Karam & Zaki, 2014; Mullings & Mahabir, 2018).

In addition, the renewed interest in the role of trade is largely underpinned by the latest wave of globalization which has been characterized by not only rely on trade integration and trade openness, but has also been associated with technological revolution (Sokolov-Mladenović et al., 2017).While with the rapid development of technology, investments in information and communication technologies (ICT) are seen as a key driver of trade and economic performance.

Thus, the researchers and economists started to study the impact of ICT on productivity growth, economic performance, macroeconomic problems, trade, and etc. base on different region or different income groups (Edquist & Henrekson, 2017). However, they do not consider the threshold effects of ICT. Hence, the objective of this study is to examine the relationship between international trade and economic performance with the threshold effects of ICT.

Literature Review

Wang & Li (2017) implement a study on testing the impact of cross-country differences in ICT on comparative advantage in international. They suggest that countries with higher ICT development level can provide easier access to ICT to firms. Thus, industries which differs in their demand for ICT in the production process. By the end, industries using ICT intensively and located in ICT developed countries are able to improve their productivity and output, thus development of ICT gain competitive advantages in international trade. To support their view, they use industry level trade data and country level ICT development data to show that ICT for developed countries have comparative advantage in industries that are R&D intensive or task complex and come out with their expected result.

Furthermore, since most of the previous researches on ICT and trade mainly focuses on the average impact of ICT on overall services trade and ignores the potential heterogeneity in its impacts across various service items. Therefore, Nath and Liu (2017) are motivated to study more on the impacts of ICT development on exports, imports, and total trade of ten service items by using panel data for 49 countries from 2000 to 2013. They separate service trades into two categories which are ICT enables service and non-ICT service and deeply examine the impact of ICT on both categories. The result show that overall ICT development has contributed significantly to the international trade of seven (out of ten) service items considered in their study where both of the import and export are significant impacted by ICT.

Additionally, Abeliansky and Hilbert (2017) suggest that ICT may affect global trade patterns through transaction costs on the supply and demand sides where the costs are affected by both the number of telecommunication subscriptions (quantity) and the speed of the available bandwidth (quality). Therefore, they implement a study on testing the differential effects of telecommunication quantity and quality of fixed and mobile telephony and internet services on countries' bilateral exports of goods. They try to overcome the two shortcoming from past studies, lack of consideration of the multilateral resistance terms and use on independent variable to represent the digital capacity that does not directly represent the digital communicational capacity.

Albiman and Sulong (2017) realize that ICT investment only provides significant economic gains for developed countries compared to developing countries, the ICT policies implementation in developing countries was based on the observation of successful case in developed countries but the ICT policies seem like not applicable to the developing countries such as Sub Saharan African region (SSA) countries. Therefore, they were motivated to study deeply on examining both linear and non-linear impacts of ICT on economic performance, with a focus on three income categories in SSA region. Furthermore, they also compare the impact of different ICT proxies, such as mobile phones, fixed telephone lines and the Internet, on economic performance. In consequence, they conclude that the impact of ICT is significant when mass critical penetration is reached and sufficient growth enhancing transmission channels of ICT and many of the ICT variables are positive and significant in lower-middle-income and upper-middle-income countries compared to lower-income countries. Among all ICT proxies, fixed telephone lines has the highest impact on economic performance for lower-middle-income and upper-middle-income countries while the impact on lower-income countries is insignificant which followed by the impact of using mobile phones towards lower-middle-income and upper-middle-income countries while the impact for lower-income is insignificant.

Data and Methodology

In this research, Hansen (2000) panel threshold regression model is exercised to examine the relationship between the independent and dependent variables. The data is collected from World Bank database for 60 countries, from year 2000 to 2016 based on annual basis. The dataset is averaged over four- and five-year periods to validate the use of threshold regression estimator, where it requires a large number of cross-section units (N) with small number of time periods (T) (i.e. 2000 –2003, 2004 – 2007, 2008 – 2011, 2012 – 2016). In addition, the data averaging also tends to smooth the business cycle effect.

The dependent variable used in this study is economic performance that is measured by Gross Domestic Products (GDP) per capita. The independent variable is trade (TRADE), the proxy is the sum of exports and imports of goods and services measured as a share of gross domestic product. The control variables are import (IM) and export (EX). The threshold variable is ICT that is gauged by three indicators, namely fixed telephone subscriptions (FTS), mobile cellular subscriptions (MCS) and secure internet servers (SIS).

The model, based on threshold regression, takes the following form:

$$GDP_{it} = (\beta_1 TRADE_{it} + \gamma X_i) I(ICT \leq \lambda) + (\beta_2 TRADE_{it} + \gamma X_i) I(ICT \geq \lambda) + IM_{it} + EX_{it} + \varepsilon_{it} \quad (1)$$

Data Analysis and Interpretation

Table 1 shows descriptive statistics for the total 60 countries from the year 2000 to 2016 where the data is taking on the average into 4 periods (2000-2003, 2004-2007, 2008-2011, 2012-2016) with original data. Based on table 4.1, mean of GDP, EX, IM, TRADE, FTS, MCS and SIS are 18480.85, 172 billions, 171 billions, 88.7534, 14 millions, 477 millions and 9133.831, respectively. The highest standard deviation is 366 billions while the lowest is 80.0117 compared among the variables.

Table 1. Descriptive Statistics

Variables	Mean	Std.Dev.	Minimum	Maximum
GDP	18480.85	22213.19	0	109555
EX	172 billions	335 billions	0	2.30E+12
IM	171 billions	336 billions	0	2.80E+12
TRADE	88.7534	80.0117	0	656.715
FTS	14 millions	4.21E+07	7800	3.50E+08
MCS	477 millions	1.36E+08	562.5	1.30E+09
SIS	9133.831	4.57E+04	0	4.85E+05

Note: Sixty countries are Argentina, America, Samoa, Arab World, Armenia, Aruba, Australia, Austria, Bangladesh, Belize, Brazil, Bristish Virgin Island, Brunei Darussalam, Burundi, Cabo Verde, Cameroon, Canada, China, Colombia, Denmark, Egypt, Arab Rep., El Salvador, Ethiopia, Faroe Island, Fiji, Netherlands, India, Indonesia, Israel, Italy, Japan, Korea, Dem. People's Rep, Kuwait, Luxembourg, Macau SAR, China, Malaysia, Moldova, Saudi Arabia, New Caledonia, New Zealand, Norway, Pakistan, Philippines, Poland, Portugal, Singapore, Sudan, Swaziland, Switzerland, Thailand, Trinidad and Tobago, Tunisia, Turkey, United Arab Emirates, United Kingdom, United States, Uruguay, Vietnam, Virgin Islands (U.S.), West Bank and Gaza, Zambia

Table 2 reports the result of estimating Eq. (1) using three ICT variables which include fixed Telephone Subscriptions (FTS), Mobile Cellular Subscriptions (MCS) and Secure Internet Server (SIS) where all the variables are transformed into logarithm. Referring to Model 1, where the ICT measure is LNFTS, the point estimate of the threshold value is 13.4348 of economic performance (LNGDP) with a corresponding 95% confidence interval (13.4216 - 13.6097). To examine how the FTS affects LNGDP, the statistical significance of two regime-dependent finance coefficients β_1 and β_2 will be asses, where FTS is a negative and statistically significant determinant of LNGDP if it is less than the threshold. On the other hand, if the FTS is higher than the threshold, the impact on economic performance is negative and statistically insignificant.

Model 2 presents results of the repeated analysis, which used MCS as an alternative proxy for ICT. The threshold value is 15.7756 of GDP with a corresponding 95% confidence interval (15.7470 - 15.7896). MCS is positively affecting the GDP below and above the threshold statistically significant.

Same case with the Model 3 which present results by using SIS as an alternative proxy for ICT, The threshold value is 3.3499 of GDP with a corresponding 95% confidence interval (3.2581, 3.3928), MCS is positively affecting the GDP below and above the threshold statistically significant. According to the coefficients β_1 and β_2, there is not enough evidence to conclude the threshold effect of the ICT variables, but when above the threshold value, the coefficient of the three ICT variables were lower.

Furthermore, the LM test for the three model are 42.19, 7.34 and 17.79, respectively, while the bootstrap p-value are 0.1067, 0.67 and 0.06, respectively. Based on the results of the LM test and bootstrap p-value, FTS and MCS have not enough evidence to support the threshold effect on LNGDP while for the SIS, the result shows that the bootstrap p-value was statistically significant at α 0.10 level.

Moreover, in all three models and the linear FEM model without threshold, all the estimated coefficients on export (EX) and import (IM) are consistent with theory while the estimated coefficients on trade (TRADE) is dispute with theory. The coefficient of EX and IM are positive and statistically significant on affecting LNGDP while TRADE is negatively and statistically significant on affecting on GDP. Moreover, the results have shown that after the intervention of ICT variables, the negative coefficient of TRADE decrease which mean that the intervention of ICT variables may reduce the negative impact of trade on economic performance.

Table 2. Panel Threshold Regression Model

	Linear Model FEM without threshold	Threshold Model		
		Model 1 -LNFTS	Model 2 - LNMCS	Model 3 - LNSIS
LM TEST		42.19	7.34	17.79
Boostrap p-value		0.1067	0.6700	0.0600
Threshold estimate		13.4348	15.7756	3.3499
95% confidence interval		(13.421,13.609)	(15.7470,15.7896)	(3.2581, 3.3928)
Impact of ICT				
β1		-0.0993**	0.0769***	0.0661***
		(0.0452)	(0.0151)	(0.015)
β2		-0.0693	0.0713***	0.0261**
		(0.0429)	(0.0145)	(0.0113)
Independent and control variables				
lnEX	0.453***	0.469***	0.391***	0.406***
	(0.0938)	(0.0869)	(0.089)	(0.0906)
lnIM	0.396***	0.367***	0.340***	0.372***
	(0.0924)	(0.0857)	(0.0896)	(0.0899)
lnTRADE	-0.804***	-0.780***	-0.680***	-0.726***
	(0.0569)	(0.0507)	(0.0587)	(0.0604)
Constant	-7.566***	-6.264***	-6.484***	-6.414***
	(0.445)	(0.694)	(0.541)	(0.723)
Observations	240	240	240	240
R-squared	0.898	0.913	0.911	0.908
Countries	60	60	60	60

Notes: Standard errors in parentheses. *** indicate significance at 1% level, ** indicate significance at 5% level, * indicate significance at 10% level

From the results, there is a negative and statistically significant effect of fixed telephone subscriptions on economic performance if it less than the threshold value while both mobile cellular subscriptions and secure internet servers are having a positive and statistically significant effect on economic performance if it below or above the threshold value. Besides, the results also suggest that the impact of ICT variables on the linkage between trade and economic performance become weaker after the threshold value. Furthermore, under the FEM and the three threshold model, the explanatory variables (Export, Import and Trade) are having a consistent estimate coefficient. Export and import are positive and statistically significant on effecting economic performance which is consistent with the theory while trade is negative and statistically significant on effecting economic performance.

Conclusions

The purpose of this research is to discover the significant relationship between the economic performance with trade, and the impact of the intervention ICT on economic performance through international trade. This study uses the panel data from 60 cross countries, from 2000 to 2016 yearly to carry out the Hansen (2000) panel threshold regression model.

International goods market integration may increase growth volatility, since the trade promotes specialization of production according to comparative advantage, at the same time, economies with a more specialized production structure will be more vulnerable to external economic shocks, especially for developing countries. On the other hand, export and import are positive and statistically significant on effecting economic performance independently which is consistent with previous theory and researches. As the suggestion of import led growth theory by Herrerias and Orts (2011), import may encourage economic performance by import capital and intermediate goods from technologically more advanced countries which may become a form of technology transfer and a source of competition that stimulates the competitiveness of domestic industry, hence, increase labor productivity and output in long run. Moreover, there is threshold effect of ICT variables on economic performance along with trade but it prove the indirect positive (mobile cellular subscription and secure internet server) and negative (fixed telephone subscriptions) effect on economic performance below or above the threshold value which may cause by the small sample size. ICT is playing a main role on development of economic, trade liberalization, and globalization by improving connection between firms and customers, increasing probability for starting a new business, and enhancing information availability.

Meanwhile, the indirect negative impact of fixed telephone subscriptions on economic performance was also proven in the research of Albiman and Sulong (2017), in their empirical results, non-linear effects of fixed telephone lines on economic performance is negative and significant for both higher-income and lower-income countries in long run. They claim that mass penetration of ICT, especially for fixed telephone lines, without economic structural transformations may do more harm to the economy. Besides, as the continuous innovation of technologies, the traditional ICT mechanism, such as fixed telephone, may soon be replace by the new ICT mechanism, such as wireless mobile, by lower cost and more effective. Hence, the traditional ICT mechanism may induce higher cost compare with the wireless mechanism.

The implication of this study finds that the international trade in improving economic performance depends largely on ICT at the initial stage. Subsequently, the roles of ICT are to assist international trade to maintain at a sustainable level to influence economic performance.

References

Abeliansky, A. L. and Hilbert, M.
2017
“Digital technology and international trade: Is it the quantity of subscriptions or the quality of data speed that matters?” Telecommunications Policy, 41, 35–48.
Albiman, M. M. and Sulong, Z.
2017
“The linear and non-linear impacts of ICT on economic growth, of disaggregate income groups within SSA region.” Telecommunications Policy, 41(7-8), 555-572.
Edquist, H. and Henrekson, M.
2017
“Swedish lessons: How important are ICT and R&D to economic growth?” Structural Change and Economic Dynamics, 42, 1–12.

Herrerias, M. J. and Orts, V.
2011
“Imports and growth in China.” Economic Modelling, 28, 2811–2819.
Karam, F. and Zaki, C.
2014
“Trade volume and economic growth in the MENA region: Goods or services?” Economic Modelling, 45, 22–37.
Kim, D. H., Lin, S. C. and Suen, Y. B.
2016
“Trade, growth and growth volatility: New panel evidence.” International Review of Economics and Finance, 45(32), 384–399.
Nath, H. K. and Liu, L.
2017
“Information and communications technology (ICT) and services trade.” Information Economics and Policy, 41, 81–87.
Mullings, R. and Mahabir, A.
2018
“Growth by Destination: The Role of Trade in Africa’s Recent Growth Episode.” World Development, 102, 243–261.
Pradhan, R. P., Arvin, M. B., Hall, J. H. and Norman, N. R.
2017
“ASEAN economic growth, trade openness and banking-sector depth: The nexus.” EconomiA, 18(3), 359–379.
Sokolov-Mladenović, S., Milovančević, M. and Mladenović, I.
2017
“Evaluation of trade influence on economic growth rate by computational intelligence approach. Physica A: Statistical Mechanics and Its Applications.” 465, 358–362.

QUALITY FUNCTION DEPLOYMENT FOR A ROMANIAN COMPANY

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Abstract

Purpose *– The purpose of this work is to describe an attempt to implement a quality instrument as well as an important lean planning tool in a Romanian company.*

Methodology/approach *– Quality Function Deployment QFD was used as methodology. It allows to the company to translate the client requirements as voice of customer into the quality features for the products and processes.*

Findings *– A scientific documentation for the decision making process was obtained. The planning of products and services became a custom driven process.*

Research limitations/implications *– This article presents the first attempt of the company in order to implement the quality deployment function. Some of the process definition was done based on the manager and specialist experience. More detailed scientific description can be done at process level.*

Practical implications *– The scope of the research is based on the nature of firm's products and processes understanding. The starting point was given by the customer requirements.*

Originality/value *– A low number of Romanian companies have implemented lean manufacturing tools. This work has value for other small and medium enterprises which want to have better planning tools. The internal validity of the model was given by the input variables which were in logical relationship with the study. The external validity is given by the possibility to generalize the result to other fields as future work.*

Key words: *decision making, lean manufacturing, quality function deployment.*

Introduction

All types of organizations have faced an increased level of competition as a result of consolidation of multinational firms and globalization process. The old way of production and process design was improved by implementation of new methods and instruments. Lean manufacturing is among the new implemented methods. It helps the company to increase the productivity by waste minimization. Lean has as central point the added value for products and processes. It was introduced by Toyota Production Systems. (Womack, Jones and Roos, 1990). The establishment of a lean production helps the firm to accomplish more using less resources. There are mentioned some figures for comparison of lean production with mass production in the literature review: the production cost decreased by 50%, the waste declines by 80%, labor is reduced by 50%. In the same time, the output, quality and profit are higher or in the worst case maintained (Antony, 2004). Lean is a new viewpoint of production management. It is very useful for the following aspects:

- design of production system in a proper manner for managerial actions,
- control of the system in order to reach the set targets;
- continuous improvement and leadership of the system.

An element which determine a higher added value is a better quality in accordance with customer requirements. The superior value is different for each market segment. The quality of products and services must be designed into each of them. There are different techniques which help one to do this. Quality Function Deployment (QFD) is one of them. It is a structured methodology to outline the

customer desires and transform them in specific plans to manufacture only products which meet these needs. The main difference between QFD and other conventional quality management tools is that it inserts quality directly into the product and not applies inspections out of it.

Literature review

There are numerous studies about the quality function deployment and its applications in different fields. The method was used in the traditional approach as well as with various improvements made in order to enhance its quality.

A review of fundamental concept of QFD and five case studies were presented by Mehrjerdi in 2013. The results prove that in order to obtain competitive advantage a company need to be committed to the needs and desires of its clients. (Mehrjerdi, 2013).

Dehe and Bamford implemented QFD to support healthcare infrastructure design decision for UK The usage of QFD at the design process allow to generate efficiency and effectiveness in the process (Dehe and Bamford, 2017).

Gonzales et all presented a QFD analysis for the design of a school furniture in developing countries. The case of Costa Rica was used because of the percentage of national budget for education used for buying new furniture. The results of their study were directed both for QFD practitioners as well as for furniture designers. (Gonzales et all, 2003)

Killen, Walker, and Hunt outlined the use of QFD for strategic planning. QFD provided the way to define the issues faced by the organization in terms of customers, stakeholder outcomes and key strategic opportunities. (Killen, Walker, Hunt, 2005)

Enhanced versions of quality function deployment were developed. Gotzamani incorporated a multivariate Markov Chain model to describe the patterns of changes of customer preferences. The subjectivity of voice of customer was approached by fuzzy AHP method. All these improvements of the method are very useful for anticipating the customer desires. (Gotzamani et all, 2018)

Ramasami and Selladurai proposed a fuzzy logic quality function deployment. The relation between the engineering characteristics and customers attributes are defined by rule-based knowledge system. The paper offered practical help for defining non-crisp customer attributes in QFD.

Bouchereau and Rowlands outlined how several techniques as fuzzy logic, artificial neural networks and Taguchi method can be combined with quality function deployment. The resulted model benefits by the synergy effect.

Methodology

Quality Function Deployment QFD method was used in order to study the implementation of a lean approach in a Romanian company. The Quality Function Deployment method was developed in 1966 in Japan. It can be used for tangible products and non-tangible ones- services. The importance of the method was demonstrated by Mitsubishi Heavy Industries Kobe Shipyard in 1972. The first book which describes QFD was published in Japanese in 1978 and translated in English by Mizuno and Akao in 1994. The goal of QFD is to transform subjective quality criteria in objective criteria which will be used in the design and manufacturing processes. The customer demand is transformed by translation in design targets. The practice demonstrated a decrease in development time by one third to a half after QFD implementation (Akao, 1990).

The method involves cross-functional teams to solve issues generated by the necessity of design and manufacture products which satisfy the needs and desires of clients. QFD methodology uses specific matrixes for each phase. The matrices are connected together using priority from the previous matrix. Their goal is to translate the needs from the higher levels into product requirements or technical characteristics from lower level.

QFD has four phases. Each of them uses a matrix in order to translate customer requirements through production. The first phase is product planning and is also called the House of Quality. It is led by the marketing department. Many organizations cover only this part out of the QFD method. The second phase is product design and is led by the design department. Manufacturing department managed the

third phase: process planning. The last phase is process control and it is executed by the quality department in cooperation with manufacturing. Performance indicators are created for monitoring the production processes and skills training of operators.

Case Study

This study presents the design of quality function deployment for a Romanian small company. The model was developed using the free Traditional House of Quality template provided by QFD online and sponsored by Six Sigma Products Group Inc.

The company produces furniture for individuals and small organizations. It is located in Bihor County. Due to confidentiality reasons its name is not reveal. The company worked empirically in first years of activity but the managers understood it is not enough. The lack of greater financial and other type of resources pushed them to pay attention to new methods which allow a better usage of the existent resources. The lean manufacturing methods and principals were considered because provide better outcomes by diminishing the waste at all levels. The quality function deployment was selected. The application of house of quality was the central point of this study.

The most common used matrix from the QFD methodology is the House of Quality. The basis of the house of quality is the idea that products and services must be designed according with customers 'preferences. The method names the customer preferences "WHATs" and the engineering characteristics "HOWs".

The first matrix illustrates the Customer requirements versus Technical requirements. Six attributes were underlined for the analysis: reliable, cheap, easy to use, easy to assemble, stable in time and good quality for the products. These attributes are the rows in the central matrix of the house of quality. The next step is to define the weights. It represents the relative importance of each attribute from the point of view of customer perspective. On the next phase must be defined the design characteristics which generate performance. They are linked to customer attributes. For this case study, they are: low weight, size, great number of colors, maintenance cost, manufacturing precision, time of assemble and purchasing price. The body of the central matrix will be filled. Each cell represents a relation between the customer attribute and the design parameter. The relation can be strong (score 9), moderate (score 3) or weak (score 1). The comparison with competition is illustrated in the right side of matrix. Three main competitors are considered for this case study. They are evaluated from the worst (score 0) to the best (score 5). The last part of the analysis is the correlation between design parameters. The roof of the matrix shows the strength and the direction of the relationship between design parameters. In order to develop the prioritize technical descriptor one must specifies the degree of technical difficulty, target value, absolute weight and relative weight. The technical difficulty is used to estimate the ability to implement certain quality improvement. Each technical descriptor is ranked from "easy to accomplish" (score 0) to "extremely difficult" (score 10).

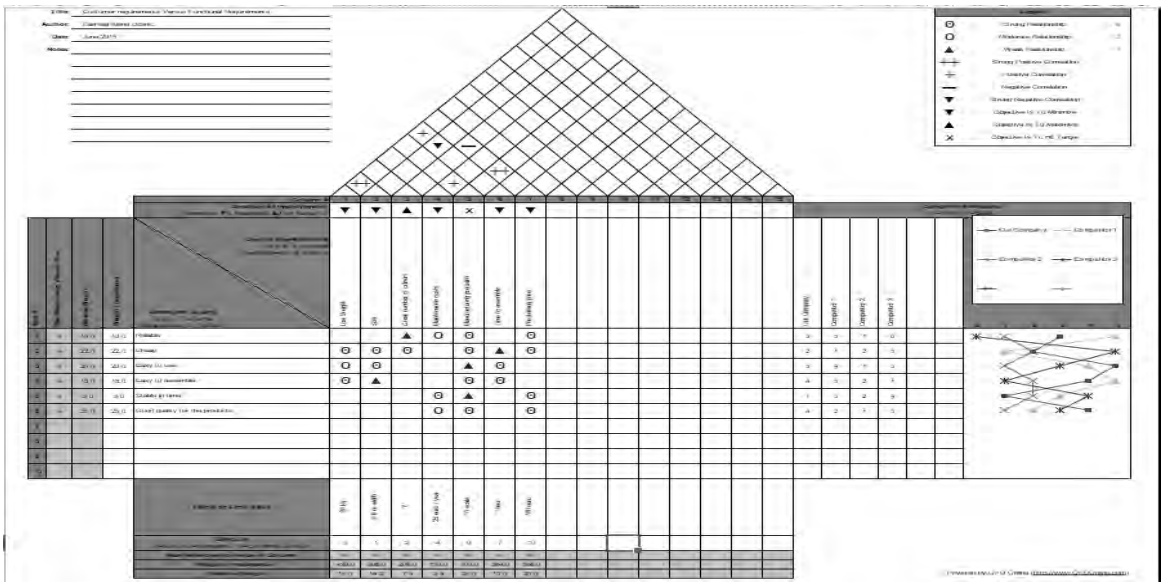

Figure 1: Customer requirement versus Functional Requirements

The second matrix will be developed respecting the same rules. It illustrates the functional requirements versus production attributes. The new “WHATs” are the functional requirements: low weight, size, great number of colors, maintenance cost, manufacturing precision, time of assemble and purchasing price. The new “HOWs” are the production attributes: duration of cutting time, cost of materials, quality of materials, usage of standard machines, process flexibility and size of scrap.

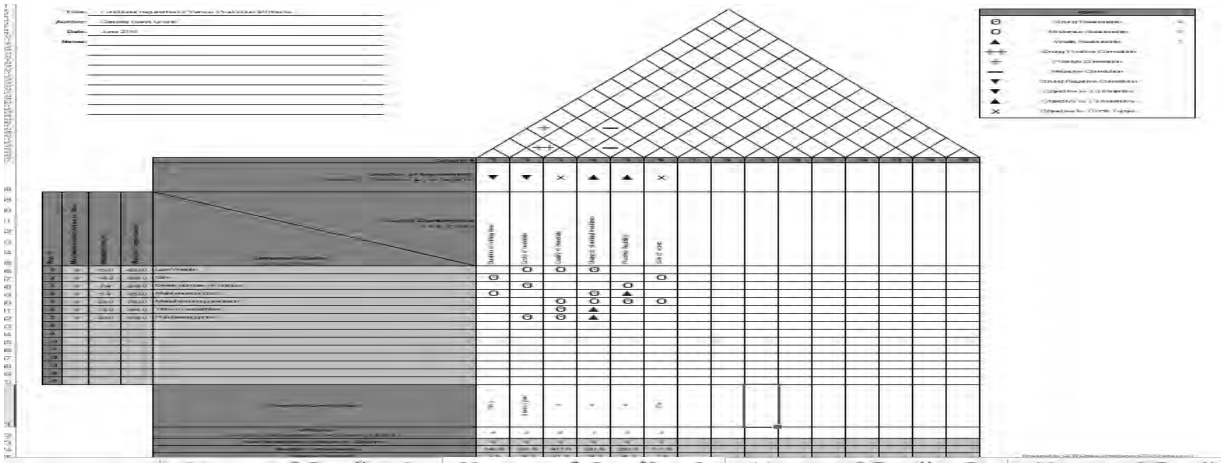

Figure 2: Functional Requirements versus Production attributes

The last matrix illustrates the relation between production attributes versus materials. The new “WHATs” are the “HOWs” from the previous matrix. The new “HOWs” are material type, brand of accessories, worker experience, and programmer experience.

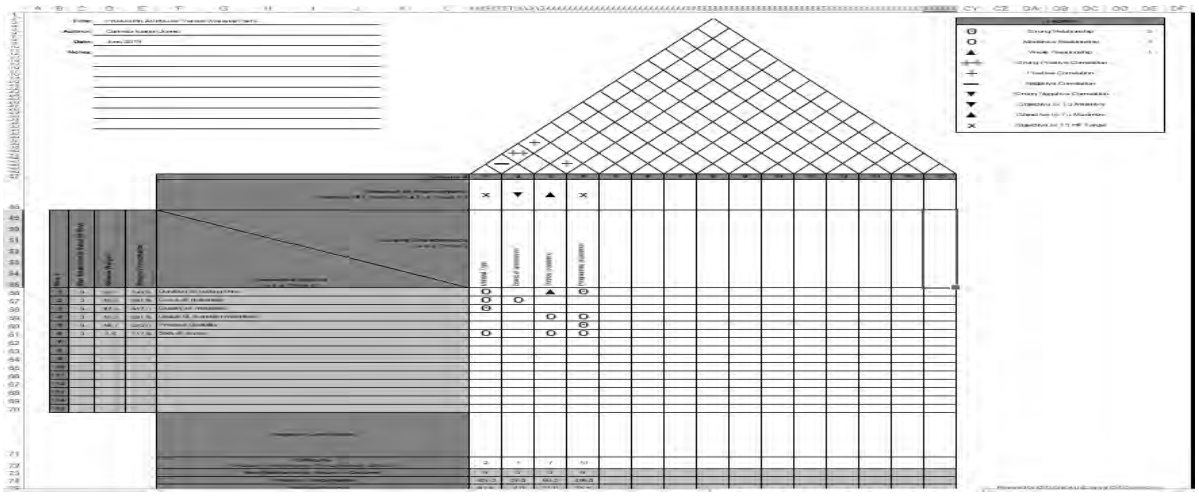

Figure 3: Production attributes versus Material/ Parts

Conclusions

The implementation of quality function deployment at the furniture producer was difficult because it required a high level of resources. The main problem was the lack of a cross-functional team. Another weak aspect was the great initial costs in comparison with the traditional design methods. The method is recommended only for products with a long life cycle or for expensive products.

The company produces common furniture for individual customers or for small firms. The price of the products is very important for majority of the customers. They do not want to invest much money in furniture because prefer to change it quite often. The weight for price is 22%. The manufacturing precision has the biggest relative weight 25%. The competitive analysis shows that the firm is better than all main competitors for the characteristics easy to use and good overall quality. The worst situation is for the characteristic stable in time. The customers complained about the detachment of edges and displacement of joints. Quality of materials followed by the cost of materials and usage of

standard machines require attention as can be observed from the second matrix. Last but not least, the type of material and programmer experience are the most important “HOWs” elements from the third matrix.

In spite of the fact that the company stopped for the moment the implementation of quality function deployment among its managerial tools, it provide valuable information. If in the future the firm enter in better market segments it can refine the QFD.

References

Akao, Y.,
1990
Quality Function Deployment, Productivity Press, Cambridge MA. Becker Associates Inc,
Antony, J. et all
2004
Using six Sigma, IEE Manufacturing Engineer, February/ March.
Bouchereau, V., Rowlands, H.
2000
Methods and techniques to help quality function deployment (QFD), Benchmarking: An International Journal, Vol. 7 Issue: 1, pp.8-20, https://doi.org/10.1108/14635770010314891
Dehe, B., Bamford, D.
2017
Quality Function Deployment and operational design decisions – a healthcare infrastructure development case study, Production Planning & Control, 28:14, 1177-1192, DOI: 10.1080/09537287.2017.1350767
González, M.E., Quesada, G., Bahill, A.T.,
2003
Improving Product Design Using Quality Function Deployment: The School Furniture Case in Developing Countries, Quality Engineering, 16:1, 45-56, DOI: 10.1081/QEN-120020770
Gotzamani, K. et all
2018
Introducing multivariate Markov modeling within QFD to anticipate future customer preferences in product design, International Journal of Quality & Reliability Management, Vol. 35 Issue: 3, pp.762-778, https://doi.org/10.1108/IJQRM-11-2016-0205
Killen, C.P., Walker, M., Hunt, R.A.,
2005
Strategic planning using QFD, International Journal of Quality & Reliability Management, Vol. 22 Issue: 1, pp.17-29, https://doi.org/10.1108/02656710510572968
Mehrjerdi, Y.Z.
2010
Quality function deployment and its extensions, International Journal of Quality & Reliability Management, Vol. 27 Issue: 6, pp.616-640, https://doi.org/10.1108/02656711011054524
Mizuno, S., Akao, Y.,
1994
QFD: The Customer-Driven Approach to Quality Planning and Development, Asian Productivity Organization, Tokyo, Japan, available from Quality Resources, One Water Street, White Plains NY.
Ramasamy, N.R., Selladurai, V.
2004
Fuzzy logic approach to prioritize engineering characteristics in quality function deployment (FL-QFD), International Journal of Quality & Reliability Management, Vol. 21 Issue: 9, pp.1012-1023, https://doi.org/10.1108/02656710410561826
Womack, J. P., Jones, D. T., Roos D.
1990
The Machine that Changes the World, Free Press, ISBN 978-0-7432-9979-4

IMPLEMENTATION OF METHODS BASED ON FUZZY TECHNIQUES IN THE PROCESS OF HUMAN RESOURCES RECRUITMENT

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Abstract

Purpose *– Fuzzy sets can be successfully implemented as a method of recruiting human resources through a multi-criteria decision-making system*

Methodology/approach *- Multi-criteria decision-making system for the evaluation of candidates in the recruiting human resources process.*

Findings *– The rigorousness and professionalism of the recruitment of human resources process are essential to its success.*

Research limitations/implications *– Fuzzy sets can be found in the portfolio of methods by which human resources can be recruited efficiently. The efficiency criterion for recruiting human resources is essential, as we have shown, because it brings the most appropriate candidates to the selection process.*

Practical implications *– This model is flexible and can be successfully applied in practice*

Originality/value *– The paper presents a decision-making system based on the fuzzy sets used in the recruitment process, under the conditions in which recruitment is carried out by a single recruiter. Recruitment criteria are relevant to graduate studies and professional experience.*

Key words: *Fuzzy sets, recruiting human resources*

Introduction

The process of human resources insurance for an organization involves the pursuit of specialized recruitment activities and then of selection, after the identification of the wanted employee, of the activities related to its integration.

The staff recruiting process involves the searching for, as well as the attracting and identifying of the potential candidates with the closest characteristics to those of the job. Among the recruited candidates, the most suitable candidate for the job to be occupied is detected. The recruitment itself is a complex process that begins with the identification of the vacancies followed by the establishment of a recruitment plan that directs the company to the most suitable sources of recruitment, internal or external. Recruitment can also take place continuously or may be accidental, contextual.

Detailing the process of recruiting human resources

Continuous recruitment is an active process by which organizations with an important number of employees constitute and maintain a portfolio of qualified specialists in a specific field or potential candidates for present vacant jobs or available thereafter.

At the same time, recruitment can also be undertaken to cover some contextual needs of the company, such as:

- strategic needs for personnel generated by restructuring or retechnologizations;

- needs to cover temporary emergencies related to specialized staff leaving the organization for reasons independent of the employer –deaths, demises, maternity and child care etc.;
- needs that can be related to the internal movements of staff, usually resulted from staff promotions on higher positions or transfers;

For a more efficient recruitment it is necessary to attract a sufficiently large number of candidates to the organization, which will lead to the identification of the most suitable candidates, those who best correspond to the requirements of the available job /jobs. In the event of continuous recruitment, the organization also has the advantage of maintaining a permanent contact with the labor market, which provides the possibilities to adapt itself to the requirements of the labor market.

The rigorousness and professionalism of conducting the recruitment process is essential to its success. The mistakes that may occur in the recruitment process adversely affect the organization's activity. At the same time, these errors remove, from the selection, the valuable potential candidates that have skills, abilities and competences useful for the company's needs. For this reason, a higher level of success in recruitment is also determined by the elaboration of recruitment strategies and policies aligned with the objectives pursued, especially in case of continuous recruitment. Employee recruitment policy also establishes elements that define the concepts, the company's code of conduct in recruiting staff as well as the specific behaviors of this activity and the company's guidelines in this field.

The organizational policies of human resources have a major impact on the efficiency of the recruitment process of staff. In managerial practice, staff recruitment strategies and policies differ from one organization to another, as they have to respond to numerous objectives, target different segments of the labour market, the field of organization’s activity is different, the characteristics of the staff and the specifics of the work are different etc.

As an organizational process, the recruitment comprises the following steps A. Manolescu (2003):

- the analysis of the available job, be it a newly created one or an older job that has become vacant, this analysis relates to its tasks and responsibilities, as well as the characteristics that the person who will occupy this post is required to possess; from this perspective, general but essential elements are pursued to determine the most appropriate sample of potential employees: qualifications and graduate studies, the professional experience, the qualities of the candidate, concretized in his personal skills and abilities, working time, the location of work etc.;
- planning the recruitment process and nominating the person responsible for the process, stage in which the following elements are established: determining the most appropriate recruitment sources, specifying the stages of recruitment and deadlines, the elaboration of job advertisement. determining the means by which the publicity of the job is done, establishing the documents necessary to support the candidature for the job, the content of the candidate's dossier (if deemed necessary), the most common documents being the Letter of intent accompanied by a Curriculum Vitae, the establishing of the criteria for preliminary analysis of the requested documents, specifying the criteria for analyzing their content, establishing all the details related to the preliminary interview, face to face with the candidate (if the interview is planned);
- after the period of documents submission expires, the period of screening the personal documents submitted by the candidates shall be started, the stage in which the following are analyzed: the existence and correctness of the Letter of intent and of the CV, elements related to the appearance and the correctness of their elaboration, the coherence of ideas and motivations etc.);
- the next stage of recruitment involves the analysis of the content of the documents submitted by the candidates, by using criteria referring to: graduated studies, professional experience, results obtained at previous jobs or during the period of tuition, duration of employment at previous employers, awards or certifications obtained, training followed, voluntary involvement etc.
- the last stage of recruitment may consist of a preliminary interview taking place under the conditions in which the face-to-face assessment of candidates is required; its aim is to check certain criteria which are considered essential for the job and, at the same time, to eliminate

the inappropriate applications in the early stages; to this interview, depending on the recruitment planning, all candidates are invited or there is the option of organizing the interview only for candidates who have successfully exceeded the dossier screening phase.

Description of the methods based on the fuzzy sets

a) The prerequisites for using fuzzy sets in the recruitment process

The notion of fuzzy set was introduced in 1965 by L.A. Zadeh with the significance of unclear, vague, inaccurate set. The concept of fuzzy has emerged from the necessity to express quantitatively the vague set, imprecise which is an approach from another perspective of the concept of the sets, different from the classical conception materialized in probability theory, mathematical statistics, information theory etc. Thus, the fuzzy set defines the belonging of an element to a multitude, as well as its non-belonging, in the context in which there are a number of transitional situations, of a continuous nature, characterized by degrees of different belonging.

Fuzzy sets are based on a multivalent logic that allows the definition of inter-mediating values and their location between binary assessments such as: true/false, yes/no, white/black, etc. The relative types of "very good" or "weak" form assessments can be, in this way, formulated mathematically and processed in the form of an algorithm.

With the help of fuzzy sets there are defined the fuzzy variables that are constructed on a particular domain, in which many descriptors/linguistic terms are included. The graphical representation of these fuzzy variables is done through cognitive frames called cognition frames. These cognitive frames represent the linguistic terms projected on the field of variable definition.

The fuzzy set creates the premises for using flexible methods to treat uncertainty, by means of the tools necessary for computer representation of concepts such as, for example, the professional experience of a candidate for a job, experience that can be described by linguistic variables from "highly experienced", "experienced" to, at the other extreme, "inexperienced". This is the form by which fuzzy sets associate the linguistic or qualitative description of the terms with equivalences in numerical or quantitative form.

As a result, the methods based on fuzzy set are not vague, nor inaccurate, but only operate with vague concepts, without producing ambiguous results, which makes it usable in many areas that require system analysis. As a result, the extension of its application has also manifested itself in the management of the company's human resources.

Possibilities for the implementation of fuzzy sets in human resources recruitment.

Fuzzy sets can be found in the portfolio of methods by which human resources can be recruited efficiently. The efficiency criterion for recruiting human resources is essential, as we have shown, because it brings the most appropriate candidates to the selection process.

The implementation of methods based on fuzzy sets is carried out differently, depending on several elements. From the perspective of this approach, the following are important: if the recruitment is a preliminary interview or not, if the recruitment phases are done by a commission or not, and, the last essential element is represented by the recruitment criteria established before it by planning the recruitment process. In order to simplify the demonstration in this study, it was arbitrarily established that the two criteria were the candidate's studies and professional experience. The number of these criteria can be extended depending on the nature and type of the job, its importance in the organizational chart, the estimated number of candidates from the recruitment sources etc. The evaluation of the two criteria is done by assigning degrees.

In order to maximize the relevance of the proposed methods, we propose the classification of existing situations in practice, as follows:

1. For situations where recruitment takes place without a preliminary interview and the selected criteria chosen are: graduate studies and professional experience in the field of the job to be occupied; thus, two possibilities are highlighted:

1. a. Recruitment will be carried out with a single recruiter;

1. b. Recruitment will be carried out by a recruitment committee consisting of N members;

2. In case the recruitment has as stage a preliminary interview as well, the following situations are highlighted:

2. a. Recruitment will be carried out by a single recruiter, in which case the assessment coincides with the case described in point 1. a.;

2. b. Recruitment will be carried out by a recruitment committee for all its stages, a situation which coincides with that described in point 1. b.;

2. c. Recruitment is carried out by a single recruiter up to the time of the preliminary interview, but the interview is assessed by a commission; in this case there is a combined situation involving the composition of the assessments of each member of the Commission.

The paper presents a decision-making system based on the fuzzy sets used in the recruitment process, under the conditions in which recruitment is carried out by a single recruiter. Recruitment criteria are relevant to graduate studies and professional experience.

b) Decision-making system for the assessment of the candidates based on fuzzy sets

For the implementation of the multi-criteria decision-making system for the evaluation of candidates, used in the recruitment process, the following steps are taken:

A. Defining the criteria (inputs to the decision-making process) in relation to which the assessment of candidates will be performed

The criteria in relation to which the candidates are evaluated are:

1. Relevance of studies;
2. Acquired professional experience.

B. The variation ranges of input quantities are defined

The range for the *Relevance of the Studies* is that of (1).

$$STUDIES - RELEVANCE : D_{STUDIES-RELEVANCE} = [0, 10] \quad (1)$$

The range for the *Acquired Professional Experience* is presented in (2).

$$ACQUIRED - EXPERIENCE : D_{ACQUIRED-EXPERIENCE} = [0, 10] \quad (2)$$

C. Defining the language variables associated with each input.

The input *Relevance of the Studies* is associated with the linguistic variable STUDIES RELEVANCE.

The input *Accumulated Professional Experience* is associated with the linguistic variable ACQUIRED EXPERIENCE

D. Defining linguistic terms associated with each input

Linguistic terms associated with linguistic variable STUDIES RELEVANCE are those of the relationship (3):

$$STUDIES\ RELEVANCE : \quad TL_{STUDIES\ RELEVANCE} = \{fm, m, Md, M, FM\} \quad (3)$$

where: fm-very small; m: small, Md- Medium, M-High, FM: Very high.

Linguistic terms associated with the linguistic variable ACQUIRED EXPERIENCE are presented in the relationship (4):

$$ACQUIRED\ EXPERIENCE: TL_{ACQUIRED\ EXPERIENCE} = \{fm, m, Md, M, FM\} \quad (4)$$

where: fm - very small; m: small, Md- Medium, M- Large, FM: Very High.

E. Establishment of the membership functions associated with each language term corresponding to the input variables.

In the case of the variable associated with the RELEVANT -STUDIES all the linguistic terms were associated with triangular-type membership functions (Figure 1).

For the linguistic variable associated with the ACQUIRED EXPERIENCE, the linguistic terms input variables corresponds to the triangular-type belonging functions (Figure 1).

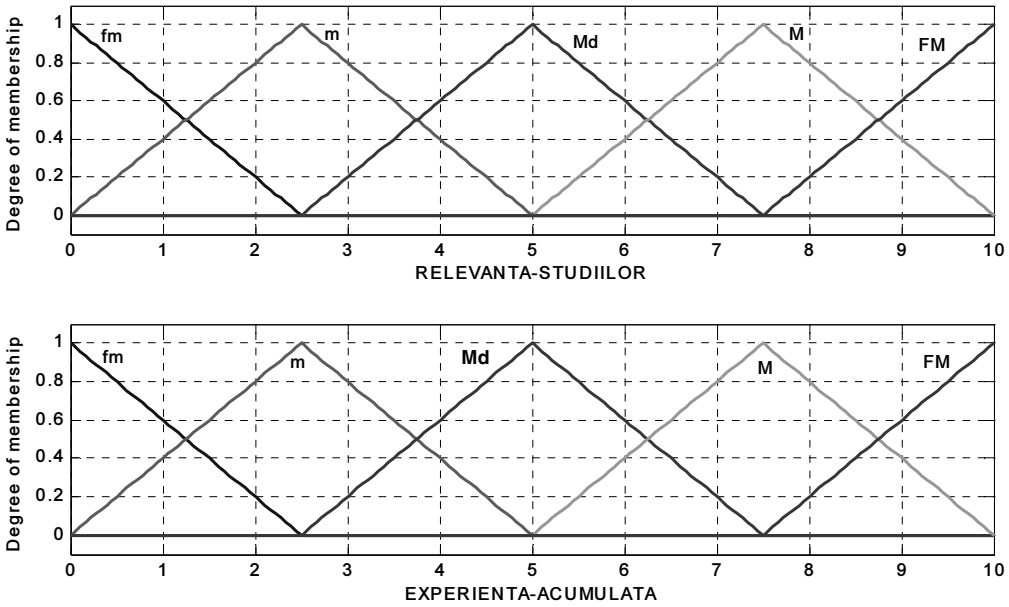

Figure 1. Input variables. Membership functions

E. Defining the output size of the decision-making process

Output variable of the decision-making is ACHIEVED SCORE.

F. The variation field of the output variable is:

$$ACHIEVED\ SCORE:\ D_{ACHIEVED\ SCORE} = [0, 10] \quad (5)$$

F. Definition of the linguistic variable associated with the output variable

Output variable ACHIEVED SCORE is associated with the ACHIEVED SCORE linguistic variable.

G. Establishing the linguistic terms associated with the output variable.

The ACHIEVED SCORE output variable is associated with the linguistic domains presented in (5).

$$ACHIEVED\ SCORE:\ TL_{ACHIEVED\ SCORE} = \{fm, m, Md, M, FM\} \quad (6)$$

where: fm - very small; m: small, Md- Medium, M- Large, FM: Very High.

H. Establishing membership functions associated with each linguistic term in case of output size.

The linguistic terms corresponding to the output variable are associated with the following triangular type membership functions (Figure 2).

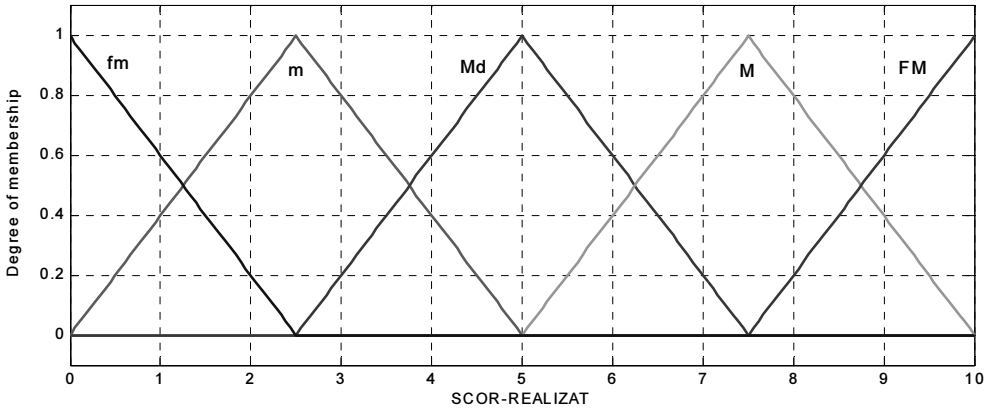

Figure 2. Output variable. Functions of membership

I. Establishing the method of connecting the various values of the membership functions

The multitude of linguistic variables and linguistic terms, which have been associated with the functions of belonging, "vaguely" characterize the farms values of the incoming and outgoing sizes. Connection is made by MIN-MAX method, resulting in 25 rules of inference of the form presented below.

1. If (STUDIES RELEVANCE is fm) and (ACQUIRED EXPERIENCE is fm) then (ACHIEVED SCORE is fm)
2. If (STUDIES RELEVANCE is fm) and (ACQUIRED EXPERIENCE is m) then (ACHIEVED SCORE is fm)
3. If (STUDIES RELEVANCE is fm) and (ACQUIRED EXPERIENCE is Md) then (ACHIEVED SCORE is m)
4. If (STUDIES RELEVANCE is fm) and (ACQUIRED EXPERIENCE is M) then (ACHIEVED SCORE is Md)
5. If (STUDIES RELEVANCE is fm) and (ACQUIRED EXPERIENCE is FM) then (ACHIEVED SCORE is Md)
6. If (STUDIES RELEVANCE is m) and (ACQUIRED EXPERIENCE is fm) then (ACHIEVED SCORE is fm)
7. If (STUDIES RELEVANCE is m) and (ACQUIRED EXPERIENCE is m) then (ACHIEVED SCORE is m)
8. If (STUDIES RELEVANCE is m) and (ACQUIRED EXPERIENCE is Md) then (ACHIEVED SCORE is m)
9. If (STUDIES RELEVANCE is m) and (ACQUIRED EXPERIENCE is M) then (ACHIEVED SCORE is Md)
10. If (STUDIES RELEVANCE is m) and (ACQUIRED EXPERIENCE is FM) then (ACHIEVED SCORE is Md)
11. If (STUDIES RELEVANCE is Md) and (ACQUIRED EXPERIENCE is fm) then (ACHIEVED SCORE is m)
12. If (STUDIES RELEVANCE is Md) and (ACQUIRED EXPERIENCE is m) then (ACHIEVED SCORE is Md)
13. If (STUDIES RELEVANCE is Md) and (ACQUIRED EXPERIENCE is Md) then (ACHIEVED SCORE is Md)
14. If (STUDIES RELEVANCE is Md) and (ACQUIRED EXPERIENCE is M) then (ACHIEVED SCORE is M)
15. If (STUDIES RELEVANCE is Md) and (ACQUIRED EXPERIENCE is FM) then (ACHIEVED SCORE is M)
16. If (STUDIES RELEVANCE is M) and (ACQUIRED EXPERIENCE is fm) then (ACHIEVED SCORE is m)

17. If (STUDIES RELEVANCE is M) and (ACQUIRED EXPERIENCE is m) then (ACHIEVED SCORE is Md)
18. If (STUDIES RELEVANCE is M) and (ACQUIRED EXPERIENCE is Md) then (ACHIEVED SCORE is M)
19. If (STUDIES RELEVANCE is M) and (ACQUIRED EXPERIENCE is M) then (ACHIEVED SCORE is M)
20. If (STUDIES RELEVANCE is M) and (ACQUIRED EXPERIENCE is FM) then (ACHIEVED SCORE is FM)
21. If (STUDIES RELEVANCE is FM) and (ACQUIRED EXPERIENCE is fm) then (ACHIEVED SCORE is Md)
22. If (STUDIES RELEVANCE is FM) and (ACQUIRED EXPERIENCE is m) then (ACHIEVED SCORE is Md)
23. If (STUDIES RELEVANCE is FM) and (ACQUIRED EXPERIENCE is Md) then (ACHIEVED SCORE is M)
24. If (STUDIES RELEVANCE is FM) and (ACQUIRED EXPERIENCE is M) then (ACHIEVED SCORE is FM)
25. If (STUDIES RELEVANCE is FM) and (ACQUIRED EXPERIENCE is FM) then (ACHIEVED SCORE is FM)

The decision-making system implemented in the Fuzzy Logic Toolbox in MATLAB ® is shown in Figure 3.

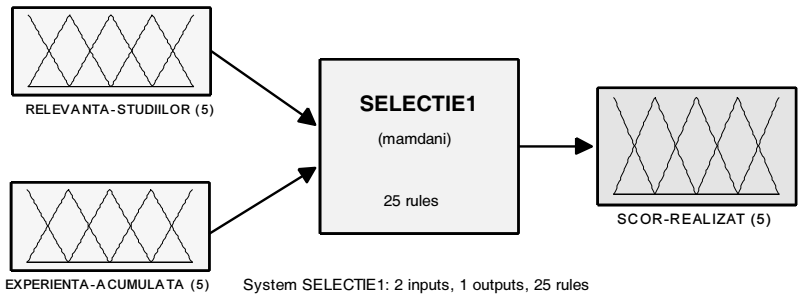

Figure 3. SELECTION1 decision system implemented in the Fuzzy Logic Toolbox in MATLAB ®

The dependency of output variable on input variables can also be highlighted by the variation area representation

J. Establishing the Defuzzification method

The result of fuzzy inference (vague) is a fuzzy information (vague) in the form of the "result" membership function.

By defuzzyfication it is understood the operation of obtaining the firm values of the output size, based on the function of the "result" belonging of the fuzzy inference.

From the multitude of existing defuzzyfication methods, it will be used the center of gravity method, the most applied method in practice.

The firm value of the output size resulting from the defuzzyfication procedure will constitute the ACHIEVED SCORE value.

A package of programs was elaborated in the MATLAB ® environment to determine the outcome of the evaluation. These programs allow:

1. Introduction of the firm values of input quantities:
    - -STUDIES RELEVANCE;
    - -ACQUIRED EXPERIENCE.

2. Determination of the output value (ACHIEVED SCORE) by use of the SELECTION 1.fis decision-making system.

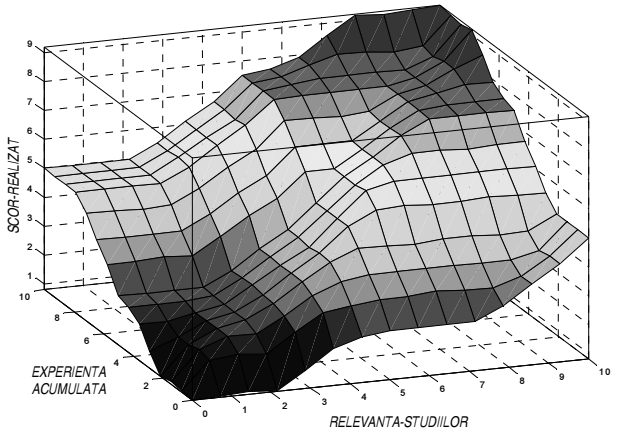

Figure 4. Variation Area

The graphical interface generated by the main program EVALUARE1.m is shown in Figure 5. This is designed for the user (evaluator).

Figure 5 Evaluator interface

Conclusions

Fuzzy sets provide effective solutions to the development of multi-attribute decisional systems. The possibility of considering several criteria, some with divergent influences, is the key resource of such a system.

In the case of recruiting candidates, the developed system becomes a very useful tool for personnel selection.

Future developments will take into account other combinations of selection criteria. Also, systems will be designed to allow several decision makers to participate in the recruitment process.

References

Barron, J.J,
1993
Putting Fuzzy Logic into Focus, Byte, Vol. 18, No. 4, pp 111 – 118.
Bălaș, D.V.
2016
Gestiunea resurselor umane prin tehnici fuzzy- rezumatul tezei de doctorat, UBB. 2016
file:///C:/Users/user/Desktop/Mihaela%20TOPAN_rezumat_balas_timar_ro_2016-02-02_14-07-38.pdf, accesat la mai 2017
Hayes, J., Rose-Quirie, A., Allinson, C.W.
2000
Senior managers' perceptions of the competencies they require for effective performance; Implications for training and development. Personnel Review 29, 1, 92-105.
Kosko, **B**., **Isaka**, **S**.,
1993
Fuzzy Logic, Scientific American, Vol. 269, July, 1993.
Manolescu, A.
2003
Managementul resurselor umane, Ed. a 4-a, Ed. Economică, București, pg.265 - 287.
Pilbeam, S. and Corbridge, M.
2006
People resourcing: Contemporary HRM is practice (3rd ed.). Essex – England: Printice Hall, pg. 142.
Schippmann, J.S., et al.
2000
The practice of competency modeling. Personnel Psychology, 53, 703 – 740.

SUPPLY CHAIN "LEAGILITY" THROUGH ADOPTING CONSIGNMENT STOCK STRATEGY IN MANUFACTURING COMPANIES

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Abstract

Purpose *– The study proposes a "leagile" solution to lowering the inventory cost by adopting "Consignment stock" strategy in supply chain.*

Methodology/approach *- An analysis has been conducted on the context the combination of leanness, agility and consignment stock could work together in order to increase overall supply chain performance. The case study illustrates how consignment stock can be an efficient way to tailor the "leagile" principles to certain supply chain processes, being cost efficient while shortening the downstream to customer.*

Findings *– Consignment stock adoption is a recommended solution to mediate Lean and Agile practices in supply chain, enhancing its overall performance by significant inventory cost reductions, cashflow increase, ensuring production continuity and eliminating lead-time and out of stock risk.*

Research limitations/implications *– The model is suitable for small, medium and large scale projects, considering no storage limitations at buyer's premises and a good communication across supply chain functions.*

Practical implications *– The case study demonstrates that consignment stock is a useful tool to improving supply chain performance when facing unpredictable demands, solving as well forecast accuracy problems.*

Originality/value *– The paper aims to contribute to the overall knowledge in respect of how to increase supply chain performance, targeting specific areas of the supply chain, by implementing consignment stock strategy and achieving "leagility.*

Key words: *Leagility, Supply Chain, Consignment stock*

Introduction

In the recent times, in order to survive on the extremely competitive markets, companies need to adapt their supply chain strategies to the more dynamic, volatile and unpredictable environment, while being simultaneously cost effective and driving for profit.

Today's competitiveness between companies is stated to be between how efficient they manage their supply chains (SC), rather than between the companies themselves (Duan and Liao, 2013). It is about the SCs that compete, not companies, and the success or failure are ultimately determined by the end-user (Christopher and Towill, 2001). According to Quinn (1997), the SC is a set of practices associated with moving goods from the raw material stage to the end-user. These practices generally include sourcing and procurement, planning or production scheduling, order processing, inventory management, logistics and customer services. In order to have an effective supply chain management (SCM), it is compulsory to improve the activity in all SC functions, and also SC practices should shift from functional and independent to general and integrative (Dawe,1994). Most of the industry players seek to improve their SCs by implementing Lean and Agile concepts and practices, which are both customer oriented, however contradictory at some points. The implementation of these concepts exposes companies and their SCs to new challenges in terms of generating cost savings, which is a lean principle, while quickly responding to the variations in the customer demand, this being an agile principle. The question is how can SC managers adhere to both lean and agile paradigms, at what

extent can leanness or agility be implemented or combined as performance capabilities in a SC (Narasimhan, Swink and Kim, 2006), in order to create synergies.

This paper intends to find a trade-off solution to the lean-agile interactions within the supply chain, focusing certain areas that need continuous improvement. Lean and Agile practices are difficult to be implemented to the whole SC, so the approach is to apply their principles to certain segments of the internal process flow, achieving efficiency and higher responsiveness downstream to the customer. The assumption is that any internal department, function or stakeholder downstream the process might be considered as customer, not only the external client or the end user.

A part of great impact in SC is inventory management. Inventory is always an issue that requires to be lowered as much as possible, in order for the SC performance to be improved. SC performance is measured by key performance indicators (KPI), set by the companies according to their specificity. In a manufacturing company, SC KPIs could be: cost savings, productivity yield, production continuity measured by the number of out-of-stock instances, reduced lead-times, reduced inventory, increased cash-flow etc., to list just a few of them.

The aim of the study is to assess the combination of both leanness and agility strategies in the context of inventory management and to propose a synergic solution in order to enhance SC performance.

Leanness, Agility and Leagility in Supply Chain. Theoretical Background

Leanness in a supply chain can be defined as “a set of organizations directly linked by upstream and downstream flows of products, services, finances and information that collaboratively work to reduce costs and waste” (Vitasek, Manrodt and Abbott, 2005). In other words, “leanness is a team-based form of continuous improvement that focuses on identifying and eliminating waste” (Myerson, 2012), by waste meaning any non-value-added activity, from the customer’s point of view. Leanness is also about understanding customer and bringing value while improving quality (Banerjee and Ganjeizadeh, 2017). By eliminating obvious waste, lean operations exchange expensive buffers, such as inventory, for less expensive ones, such as capacity, achieving performance improvements in areas of cost efficiency, conformance quality, delivery speed and reliability (Narasimhan, Swink and Kim, 2006).

On the other side, agility is “a business-wide capability that embraces organizational structures, information systems, logistics processes and in particular mindsets. A key characteristic of an agile organization is flexibility”(Christopher and Towill, 2001). Production is agile if it efficiently changes operating states in response to uncertain and changing demands placed upon it (Narasimhan, Swink & Kim, 2006, p.443). Dubey and Gunasekaran, (2014), state that agility is an overall strategy focused on thriving in unpredictable environment. Agility involves flexibilities of several sorts and includes the capability to do unplanned, new activities in response to unforeseen changes in market demands (Brown and Bessant, 2003). Soltan and Mostafa (2015), summarized agility cores in a comprehensive diagram, displayed in Fig.1.

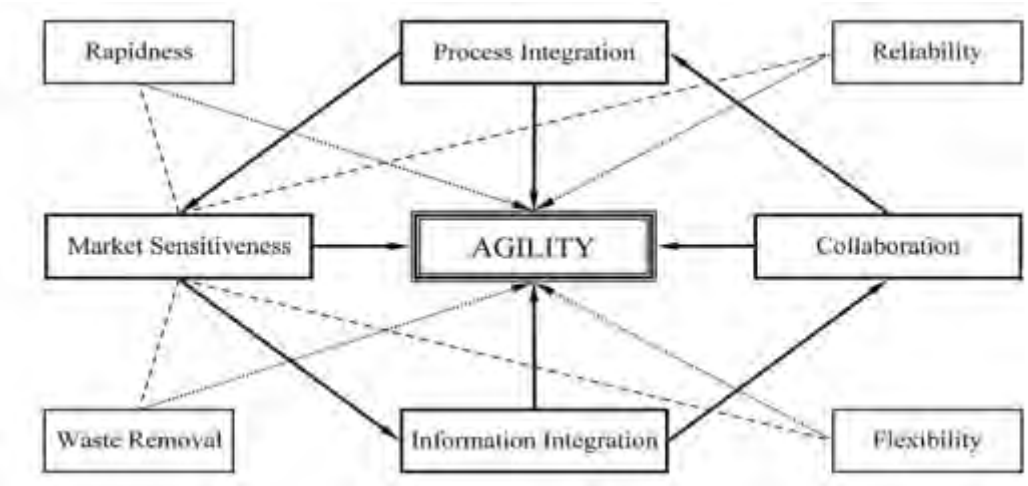

Fig.1. A comprehensive structure for agile concept (Soltan and Mostafa, 2015)

Explanations of the core capabilities and practices suggested by Soltan and Mostafa (2015) are presented in Table 1.

Table 1 Explained structure of agile core capabilities and practices

Agile Core Capabilities and Practices	Explanations	Characteristics
Market sensitiveness	Supply chain capability of reading and responding to real demand.	Flexibility, rapidness and reliability
Process integration	Developing partnerships with customers and with suppliers, joint product development.	True-based relationships across supply chain members, rapidness, reliability
Collaboration	Stimulating suppliers and customers to improve product quality; joint product development	Cooperation between the SC partners
Information integration	Utilizing advanced IT programs to share data between SC partners (suppliers, customers, manufacturer); information based SC rather than inventory based.	Ensure transparency through a virtual supply chain, adopt the same IT system to achieve rapidness

Agile supply chain management prioritizes adaptability. Short-term forecasts help companies to stay responsive, but a key aspect of agile SCs is that they respond to demand almost instantly (Web-1). Typically, this will result in shorter lead times, meaning that delivery speed and reliability are enablers of agility, which shows some overlap between leanness and agility.

Naylor, Naim and Berry (1999) keep arguing that while both lean and agile strategies are linked to supply integration, waste reduction, and lead time compression, they differ on flexibility for market responsiveness. An agile system puts more emphasis on rapid reconfigurations, whereas a lean system puts more emphasis on forecast accuracy and production scheduling. Finally, Naylor, Naim and Berry (1999) suggest that a lean system is best applied upstream from the ‘‘decoupling point’’ in a supply chain while an agile system should be applied downstream from this point. The decoupling point is defined as the stocking point which separates activities that respond directly to customer orders from activities that are driven by forecasts and demand planning (Narasimhan, Swink and Kim, 2006).

Naylor, Naim and Berry (1999), have brought in the literature the term of “leagility”, due to the substantial overlap in content of both paradigms. Over the years the term has been explored from many different perspectives, however, the reviewed literature still emphasizes that leagility is a strategic concept, representing a combination of lean and agile. Lean is assumed to be a cost-base strategy, being appropriate in a forecast-driven context upstream of the customer order decoupling point (CODP), while Agile is the corresponding flexibility-based strategy in a customer-order driven context downstream of the CODP (Wikner et al, 2015). Competitive advantage is based on aligning the CODP position with the customer requirement as shown in Fig.2. (Mason-Jones, Naylor and Towill, 2000)

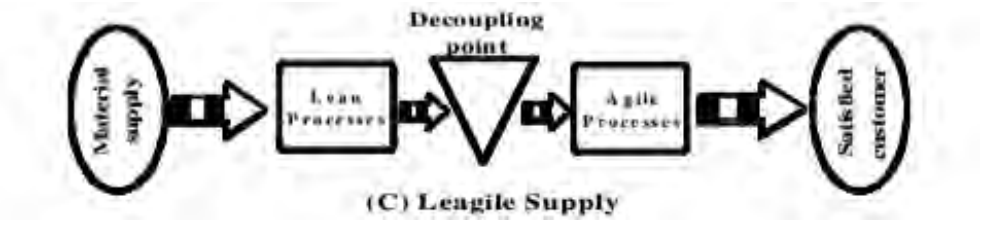

Fig. 2. Decoupling point by Mason-Jones, Naylor & Towill, 2000 (Web-3)

The strategic positioning of the decoupling point means that the best of Leanness and Agility can be achieved by minimizing costs and timing via the application of lean principles upstream and satisfying unpredictable market conditions via agile principles downstream (Web-3). As main actions, costs must be reduced, lead times have to be compressed, material flows synchronized, information flows need to be made transparent across all SC functions, in a nutshell the whole SC strategy needs to be changed in order to get a leagile SC.

"Leagility", simply defined as „the ability of supply chain design to maintain a balance of lean and agile practices" (Goldsby, Griffits and Roath, 2006) is sometimes difficult to implement to the supply chain as a whole, however it can be introduced in certain of its segments or processes, positively impacting inventory management, cash flow, profit and other elements labeled as „leagility drivers" by Banerjee and Ganjeizadeh (2017). These "leagility drivers", shown in Fig.3 are influenced by various lean principles and agile practices, which are termed as "cells of leagility" (Banerjee and Ganjeizadeh, 2017).

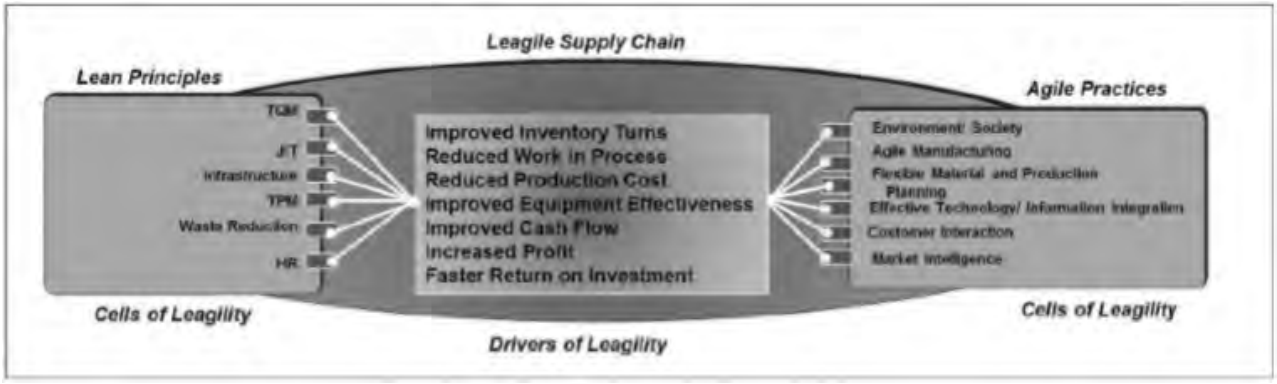

Fig. 3. Lean-Agile interaction in a leagile supply chain (Banerjee & Ganjeizadeh, 2017)

It can be noticed that improved inventory is a main driver of leagility, this is why the present study intends to find out whether adopting a hybrid approach of leanness and agility on specific SC elements, like inventory, will enable increased performances and cost savings overall SC.

When a company desires to be responsive, having a short lead-time and thereby the ability to easily shift focus (agile characteristic), it needs to maintain a high level of inventory (Hugos, 2003). High level of inventory is actually a leanness parameter, coming from the need to ensure production continuity. However, this is contradictory to operating effectively, which calls for reducing inventory levels (Hugos, 2003). This is the point where agility and leanness have to be integrated and combined into leagility for a certain segment of the SC: inventory management.

With regards to this study, the proposed trade-off solution for leagility is consignment stock strategy, adopted in manufacturing companies.

Consignment stock or consignment inventory

In manufacturing industries, the levels of inventories at all stages, i.e. raw material, work-in-process and finished goods inventories, indicate the company's competitive positioning. Reducing inventory level and cost, especially for raw materials and packaging is extremely targeted objective in corporative environment. The study proposes a "leagile" solution to lowering the inventory cost by adopting "Consignment stock" (CS) as a segmented SC strategy in manufacturing companies. The paper examines the context of introducing CS, its benefits and risks concerning both the buyer and the vendor. To briefly explain, based on experience, consignment stock is managed by the buyer, while it is property of the supplier until it is consumed, moment when it is directly invoiced to the buyer, so literally there is no inventory cost in buyer's accountancy. The concept is also present and studied in the literature, Battini et al (2010) referring to CS as an innovative approach to manage inventory. The main idea in CS is that the vendor moves a part of his inventory and maintains a stock of materials at the buyer's plant, this approach being based on a close collaboration between vendor and buyer, aiming to create a win-win situation through revenue sharing (Battini et al., 2010; Chen, Ling and Cheng, 2010). In accordance to a general CS policy, the vendor guarantees the buyer to continuously

keep a stock between a minimum and a maximum level, which have been agreed between the two parties (Valentini & Zavanella, 2003). The minimum stock level is termed as safety stock. The buyer performs a screening process immediately after receiving each delivery from the vendor and the vendor bears the warranty cost of defective items, if any. The buyer does not need to bare the financial cost associated with the inventory placed by the vendor in his warehouse, since the materials are not bought until they are needed, or even consumed (Battini et al. 2010).

Usually, CS refers to goods that are legally owned by a party called “the consignor” represented by the vendor, but are held in store by the buyer, or “consignee”. The consignee can even decide to return any leftover stock without worrying about monetary repercussions (Web-2). This type of inventory is prevalent among manufacturing concerns. The entire process is governed by a consignment agreement, which represents the legal frame that enables both parties to perform the agreed activities.

In terms of benefits and risks, things need to be separately assessed, from both consignor and consignee perspectives. Benefits are shown in Table 2, while Risks, constraints and disadvantages associated with CS, are reflected in Table 3.

Table 2 Benefits of Consignment Stock

Consignee benefits	• Consignment stock allows the consignee to significantly reduce raw materials inventory, depending on the cost of goods; basically there is no inventory to be considered for the materials in consignment policy
	• Improved cash flow
	• Shortens or even eliminates lead-times for the materials stored under consignment agreement; materials are easily accessible and ready to be used in production
	• Eliminates forecast accuracy problems and out-of stock instances
	• Increases responsiveness and customer satisfaction within the internal processes; practically, the requested materials are available at any time
	• Production capacity increase, when facing higher demands on the market; materials are on hand
	• Ensures production continuity, with no disruptions from the perspective of the consigned materials, leading to shortening the downstream to the external customer
	• It is consignor’s responsibility to replenish the stock, so no worries for the Planning and Procurement functions
	• Extended payment terms, considering that the consignor is paid only after the materials are consumed
	• Reduced transport costs due to possibilities of transport optimizations at consignor’s side
	• Overall improvement of SC performance
Consignor benefits	• Transport optimization at stock replenishment
	• Managing the production plan more effectively by getting information of real product consumption on buyer's side (Valentini & Zavanella, 2003; Gümüs et al., 2008; Battini et al., 2010).
	• Increased customer satisfaction
	• Developing partnership with the consignee, securing long-time relationship and business continuity

Table 3 Risks, constraints and disadvantages associated with Consignment stock

From Consignee's perspective	• More attention and time required by the people involved in CS arrangements, in all implied functions (disadvantage)
	• Storage space limitation could be a constraint
	• Increased complexity in stock management at consignee's premises (weekly reconciliations), seen as a disadvantage
From Consignor's perspective	• Payment will be delayed, at least at the beginning of the contract, unless the first invoice is issued - risk or disadvantage
	• The consignor's cash flow may suffer as more money is spent on manufacturing the goods, while cash coming in may be too slow to cover subsequent production runs (Web-2) - risk
	• The consignor may be exposed to higher product returns if the agents or consignees simply allow the goods to become damaged in warehouses. After all, the consignee does not have any money invested in the consigned stock (Web-2) - risk
	• The record keeping systems of the party consigning the goods and the retailer or agent are not always the same, so, a consignment stock may become disadvantageous if it brings about discrepancies in the records of both consignor and consignee (Web-2).

Case study: Adopting CS in an international manufacturing company

A single case approach has been chosen to illustrate the CS adopted strategy. Eisenhardt and Graebner (2007) recommend the use of focal case for gaining in-depth and detailed understanding. The case company is a manufacturing corporation, actually a bottler who owns facilities in several countries. In terms of turnover and headcount, the company is a large scale enterprise, overall, the facilities varying from small to large. The company is since several years under leanness implementation, considering continuous improvement, but lately it faced forecast accuracy problems due to unpredictable demands on the market, along with cash-flow difficulties in different countries.

The group management decided to address the inventory management issue, as this was directly related to forecasting activities and cash-flow. The proposal was to pick a business unit as a pilot and switch to CS inventory for as many as possible of the packaging materials, in order to reduce working capital and unlock cash flow. The facility from Bulgaria was chosen to be the pilot of the project, as it was a medium size business unit.

The presented study is based on data collection through interviews with top managers involved in the project and by first author direct involvement, as part of Procurement function, during the implementation time.

As a first step, the project owners investigated together with the internal stakeholders the readiness of the business unit to implement the change, by in-depth analyzing and assessing below mentioned aspects, to name only a part of them:

- Packaging materials to be subject of CS and which suppliers should enter into CS commitments
- Storage space; extra storage space needed and at what costs
- The readiness of the operators from the interested functions, to act under CS policy; training requirements
- Finance implications and legal regulations; draft the consignment agreements and issue the internal procedure concerning segregations of duties and responsibilities
- Process and information integration; IT programs and platforms…etc.

Cross-functional interactions are reflected by Fig. 4, including suppliers 'involvement.

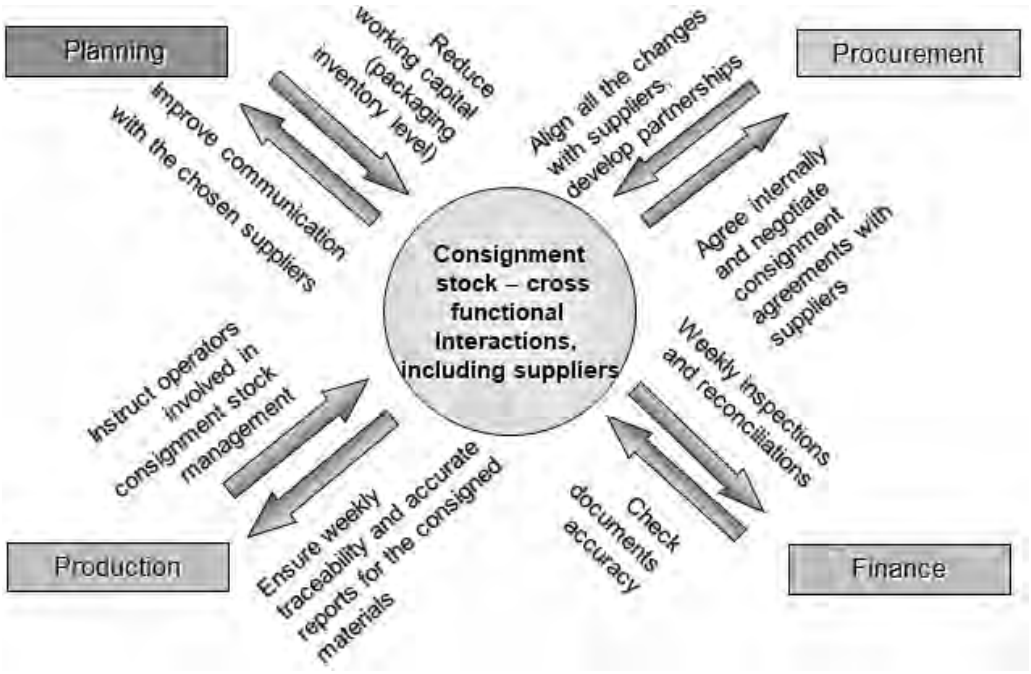

Fig.4. Consignment stock cross-functional interactions

The complex investigation led to a positive result and it has been decided to adopt CS policy for shrink & stretch films and corrugated boards, keeping the embedded suppliers. The implementation was done step by step, under the consistent guidance of the project team. Some of the challenges faced during project implementation were the reluctance of operators and even of managers, claiming the complexity of the process in certain areas, and also people resilience to changes, which is somehow in human's nature. An improved communication among all the implied parties and stakeholders support helped to overcome implementation failure.

The results gained after implementation have been measured by specific KPIs like: decreasing working capital in both volume and value, decreasing average monthly inventory value, number of out-of stock instances due to delays in deliveries, shorter lead-time, increasing of productivity and production capacity, cash-flow deployment, material cost saving, supplier reliability…etc. All these parameters have been found significantly improved when monitoring the progress. Fig.5. shows a 65 percent decrease in the average monthly inventory value for a specific material entered under CS agreement.

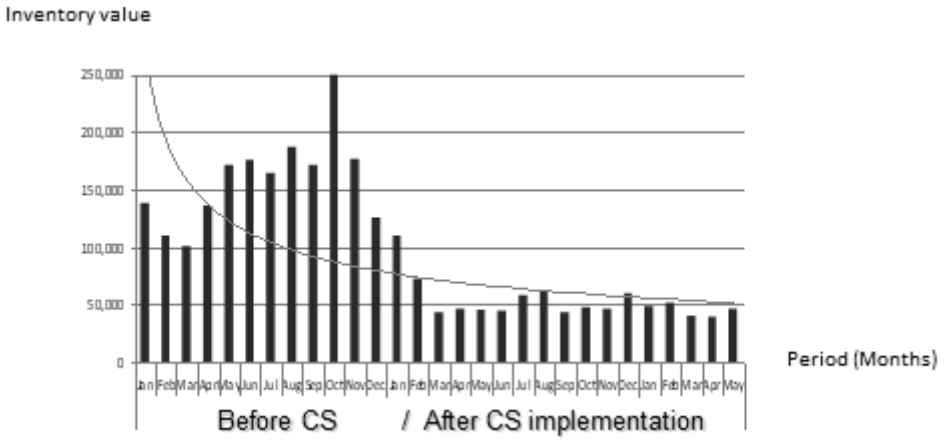

Fig.5. Decrease with 65% of the average monthly inventory value for shrink and stretch films (~102 000 EUR), after CS implementation

In terms of lead-times for the consigned materials, the decrease grade converges to about 100 percent and out-of-stock situations have been eliminated. Cost saving and inventory improvement have been achieved, no value added activities such accurate forecasting, last minute orders and production disruptions due to lack of materials were cut out, all of these representing lean parameters. On the other side, agility has been gained as well, as the SC is more flexible and can rapidly react to the increasing market demands, based on the consigned goods. Both internal and external customer satisfaction is achieved, reflecting the benefits of the CS strategy.

Adapted "Decoupling point diagram" (Mason-Jones, Naylor & Towill, 2000) upon CS implementation will look as per below, assuming that customer order point is replaced by CS:

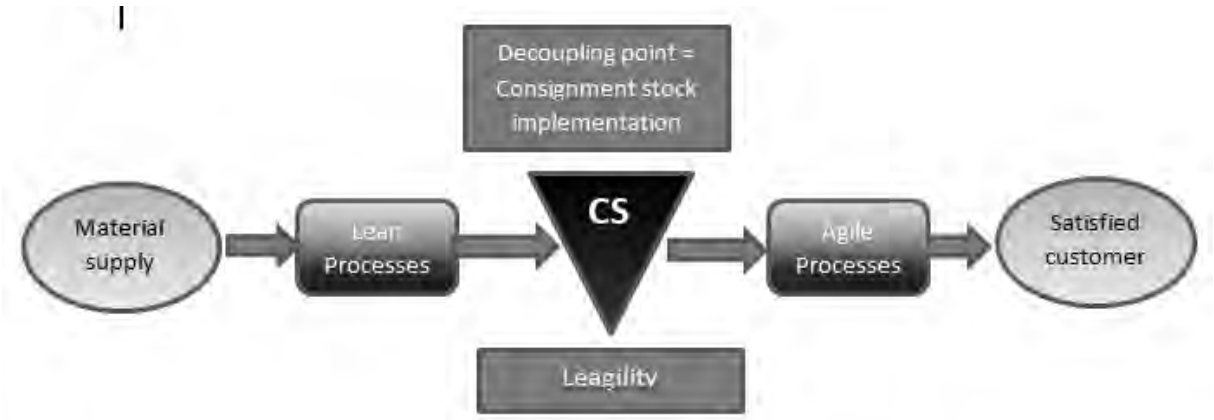

Fig.6. Adapted Decoupling point diagram (Mason-Jones, Naylor & Towill, 2000) after CS implementation

Conclusions

CS strategy is an appropriate choice for a SC, however, it is critical to understand whether the organization is ready to implement it, at what extent, and what are the correct actions to be done.

Benefits are significant in both upstream the decoupling point, where lean processes take place, and downstream the decoupling point, where agile actions occur. In a nutshell, leagility is also achieved, with the outcomes of driving for profit and customer satisfaction.

The case company decided to gradually step further with extended consigned materials, in the context of the lean practice, continuous improvement, and heading towards leagility.

Based on the deductive research approach, the case study demonstrates that CS is a useful option to increasing SC performance when facing unpredictable market demands, whilst achieving leagility, being both efficient and satisfying the customer.

CS adoption is suitable for small, medium and even large scale projects, considering no storage limitations at buyer's premises and a good communication across supply chain functions.

References

Banerjee, A.,& Ganjeizadeh, F.
2017
"Modeling a Leagility Index for Supply Chain Sustenance", Procedia Manufacturing 11: 996-1003
Battini, D., Gunasekaran, A., Faccio, M. et al.
2010
"Consignment stock inventory model in an integrated supply chain", International Journal of Production Research 48:477-500
Brown, S. and Bessant, J.
2003
"The manufacturing strategy-capabilities links in mass customization and agile manufacturing – an exploration study", International Journal of Operations and Production Management 23: 707-730

Chen, J.M, Lin, I.C. and Cheng, H.L.
2010
"Channel coordination under consignment and vendor-managed inventory in a distribution system", Transportation Research Part E: Logistics and Transportation Review 46: 831-843
Christopher, M., Towill, D.R.
2001
"An integrated model for the design of agile supply chains". International Journal of Physical Distribution and Logistics Management 31: 235-246
Dawe, R.L.
1994
"An investigation of the pace and determination of information technology use in the manufacturing materials logistic system", Journal of Business Logistics 15: 229-258
Duan, Q., & Liao,**T.W**
2013
"Optimization of replenishment policies for decentralized and centralized capacitated supply chains under various demands", International Journal of Production Economics 142:194-204
Dubey, R. and Gunasekaran, A.
2014
"Agile manufacturing: framework and its empirical validation", The International Journal of Advanced Manufacturing Technology: 1-11
Goldsby, T.J., Griffits, S. and Roath, A.
2006
"How do Lean, Agile and Leagile Supply Chains Compare?"
http://www.scdigest.com/assets/NewsViews/06-08-31-2.cfm, accessed 20.06.2018
Gümüş, M., Jewkes, E.M and Bookbindker J.H.
2008
"Impact of consignment inventory and vendor-managed inventory for a two-party supply chain", International Journal of Production Economics 113: 502-517
Hugos, M.
2003
"Essentials of supply chain management", Wiley and Sons Inc, ISBN: 0471235172, New York
Eisenhardt, K.M. and Graebner M.E.
2007
"Theory building from cases: Opportunities and challenges", Academy of Management Journal 50:25-32
Mason-Jones, R., Naylor, B. and Towill, D.R.
2000
"Engineering the leagile supply chain", International Journal of Agile Management Systems, 2: 54
Myerson, P.
2012
"Lean Supply Chain and Logistic Management" ISBN 978-0-07-176626-5, p3
Narasimhan, R., Swink, M. and Kim, W.
2006
"Disentangling leanness and agility: An empirical investigation", Journal of Operations Management 24: 440-457
Naylor, B.J, Naim, M.M. and Berry, D.
1999
"Leagility: Integrating the lean and agile manufacturing paradigms in the total supply chain", International Journal of Production Economics 62: 107-118
Quinn, F.J.
1997
What's the buzz? Logistic Management 36: 43-47
Soltan, H. and Mostafa, S.
2015
"Lean and Agile Performance Framework for Manufacturing Enterprises", Procedia Manufacturing 2: 476-484
Valentini & Zavanella
2003
"The consignment stock of inventories: industrial case and performance analysis", International Journal of Production Economics, 81–82: 215–224

Vitasek, K., Manrodt, K.B., & Abbott, J.
2005
“What makes a Lean Supply Chain?”, Supply Chain Management Review 21
https://www.scribd.com/document/56757760/Week-2-Vitasek-Et-Al-2005
Wikner, J., Backstrand, J., Tiedemann, F. et al
2015
“Leagility in a Triad with Multiple Decoupling Points”, IFIP Advances in Information and Communication Technology, Volume 459: 113-120

Web-1: http://www.nextprocess.com/procurement-solutions/lean-vs-agile-understanding-supply-chain-management-strategies/, accessed 19.06.2018
Web-2: https://www.finweb.com/investing/benefits-and-risks-of-consignment-stock.html, accessed 18.06.2018
Web-3:https://www.researchgate.net/figure/Lean-agile-and-Leagile-supply_fig4_235321441, accessed 21.06.2018

BEING A KEYSTONE WITHIN ELECTROMOBILITY ECOSYSTEM: KEY FEATURES AND COMPETITIVE BEHAVIORS

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Abstract

Purpose *– To identify and illustrate the advantage of being a keystone as an important strategy within a business ecosystem.*

Methodology/approach *– based on the literature review there was performed a critical analysis on keystones' key features. There was selected the most relevant features which contributed to the aggregation of the competitive behaviors and gathered evidences which support the proposed framework*

Findings *– Within electromobility ecosystem the competitive behaviors of the keystones are perceived as a common effort and are provided by actors outside the automotive industry*

Research limitations/implications *– Although the aggregated competitive behaviors were illustrated in Information Technology industry there is a lack of empirical evidences within automotive one.*

Practical implications *– the proposed framework can be used further in actors' competitive behaviors research and applied in emergent and creative industries*

Originality/value *– This paper provides valuable insights on the behavior of the business ecosystems actors and contributes to the understanding of companies co – evolution through aggregated competitive behaviors*

Key words: *business ecosystem, competitive behaviors, keystones.*

Introduction

Business ecosystems were widely adopted within collaborative theories. The relevance of the concept arose as result of the need to describe how collaborative mechanisms contribute to overall performance of the companies. At first the business ecosystem was proposed as a framework for analysis of competitive dynamics within a community of competitors (Moore, 1993). According to Peltoniemi and Vuori vision the interconnectivity within business ecosystems can be ensured by bringing together members from different industries (Peltoniemi and Vuori, 2005). This approach highlights the dynamics of roles changing as the ecosystems members acts differently according to the emerging opportunities. Iansiti and Levien (2004a) suggested the existence of three main roles which can be perceived within the business ecosystem: keystone, dominator and niche players. However, in the scientific literature just three of them are emphasized. In order to understand the suggested roles, there should be taken in consideration the fact that the technology advancement and increasing usage of open innovation emphasized the relevance of digitalization of collaboration. This implies that the most relevant strategy for business ecosystem development lies within those actors who acts as keystones. Thus, this paper proposes a new framework for keystones analysis, development and the potential arising competitive behaviors.

Keystone strategy within the business ecosystem

The advantage of being the keystone was conceptualized by Iansiti and Levien. According to the authors vision the actors who act as keystone are especially relevant for ecosystem further development or even renewal. They suggest that those actors provide a set of rules which contribute

to the governance of the ecosystem. Iansiti and Levien (2004a) pointed that in terms of value the success of the keystone strategy is comprised from two major processes: creating and sharing value with and to the whole ecosystem (Iansiti and Levien, 2004a). The value creation usually is associated with creating specific platforms, as instruments or technologies needed for other ecosystem's actors. Besides value creation, in keystone strategy value sharing means to increase the number of participants in business ecosystem (Iansiti and Levien, 2004a). The authors suggested that creation of a specific platform and its availability for other stakeholders ensures the dynamics of relations between keystone players and other members. For the ecosystems which are not platform-based the actors who act as keystones are especially important for resource allocation and orchestration processes (Dedehayir, Makinen, Ortt, 2016).

Keystone's key features within a business ecosystem

The initial theory states that being a keystone means for an actor to take the leading role within an ecosystem. From this point of view there should be pointed that a keystone can occupy a leading and central position within a platform-based ecosystem (Scaringella and Radziwon, 2017). The aspect which is opposite to the initial statement of Iansiti and Levien according to whom a keystone can comprise a small part of the ecosystem. This statement can be applied to the customer-centric business ecosystems and it presents the keystones as peripheral actors. Keystones presence within a business ecosystem is extremely valued in terms of their impact. From this point of view the main promoted benefit is the major impact on ecosystem's diversity (Iansiti and Levien, 2004a), evolution and further development and prosperity (Iansiti and Levien, 2004a). Den Hartigh and Van Asseldonk (2004) sustain their importance in ensuring the productivity of the established ecosystem. The keystones advantage was concretized through value creation and exploitation. However, among specific attribution of the keystones there can be traced the value capture and symbiosis between the business ecosystem members. Dedehayir, Makinen and Ortt (2016) identified the keystones as orchestrators especially in terms of resource flows governance. The fact that these actors are usually associated with value creation, the keystones represent a valuable source of innovative solution for ecosystems' members (Fragidis, Tarabanis and Koumpis, 2007), which also ensures their interactivity and interconnectivity. In terms of orchestration the keystones are relevant in the birth stage of business ecosystem. From this point of view their first priority is to anticipate potential risks (Smith, 2013) and to manage the collaboration of the potential members by creating strategic alliances. However, the key features mentioned above can be associated with keystones differently. Thus, the further analysis will be conducted based on two main criteria: the visibility of the keystones within a business ecosystem and their influence on the whole structure, as it is shown in figure 1.

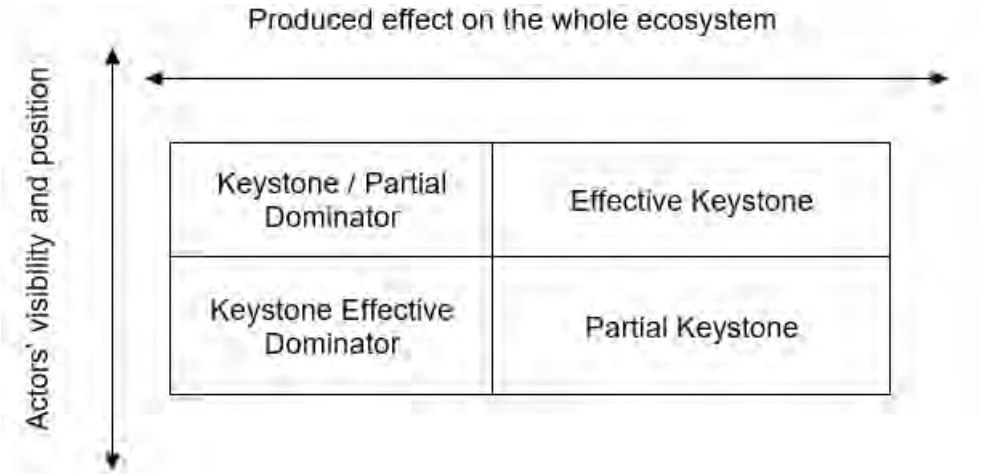

Figure 1. Framing keystone's competitive behaviors

Keystones competitive behaviors

Effective keystones – the actors who choose to adopt a central position in terms of control, orchestration and monitoring the activities within their business ecosystem (Bosch – Sijtsema and Bosch, 2015). This competitive behavior is usually associated with value creation and distribution activities within the business ecosystem (Yang, Nam and Kim, 2018) and is perceived as resource

generator for the participants (Hyrynsalmi, Suominen and Mantymaki, 2016). Being in central position means for established ecosystem that those actors are responsible for good performance and ensure the creation of barriers against the dominators (Van Schalkwyk, Willmers and McNaughton, 2016). In a platform-based ecosystem, the effective keystone can be associated with platform leader (Gawer, 2014) as they provide innovative solutions to ensure the interconnectivity of the ecosystems' members.

Partial Keystone – from the positioning point of view these actors can be traced as peripheral ones, as they can be found on different levels of the ecosystem (Bosch – Sijtsema and Bosch, 2015). The partial keystones perceive more the promotion and adoption of the innovation mechanisms which can ensure the interconnectivity driven by technology progress (Dedehayir, Makinen and Ortt, 2016). The fact which can contribute to the business ecosystem diversity. However, this competitive behavior is rather supportive than leading one as it ensures the symbiosis and good collaboration (Dedehayir, Makinen and Ortt, 2016).

Keystone / Partial Dominator – although these actors do not occupy a central position they still act as attractors for new members outside the established ecosystems. Usually they are source of innovation which ensures the increasing diversity of the ecosystems' members by promoting and triggering directly or indirectly the changes within their ecosystem (Iansity and Levien, 2004a). In the case of this competitive behavior, attracting new member also means to ensure their collaboration with other relevant stakeholders, especially beneficial symbiosis.

Keystone / Effective Dominator – the threat of being a keystone within business ecosystem context is closely linked to the increasing domination. Although these actors are in central position, they exercise a negative influence on the whole business ecosystem. The stronger domination of this actors reduces the symbiosis among ecosystems' participants in terms of mutually beneficial relations (Iansiti and Levien, 2004b, 42). The actors who adopts this behavior impose their own innovation mechanisms and trigger forced transformations, which in fact directly influence and can lead to the instability and vulnerability of the whole ecosystem.

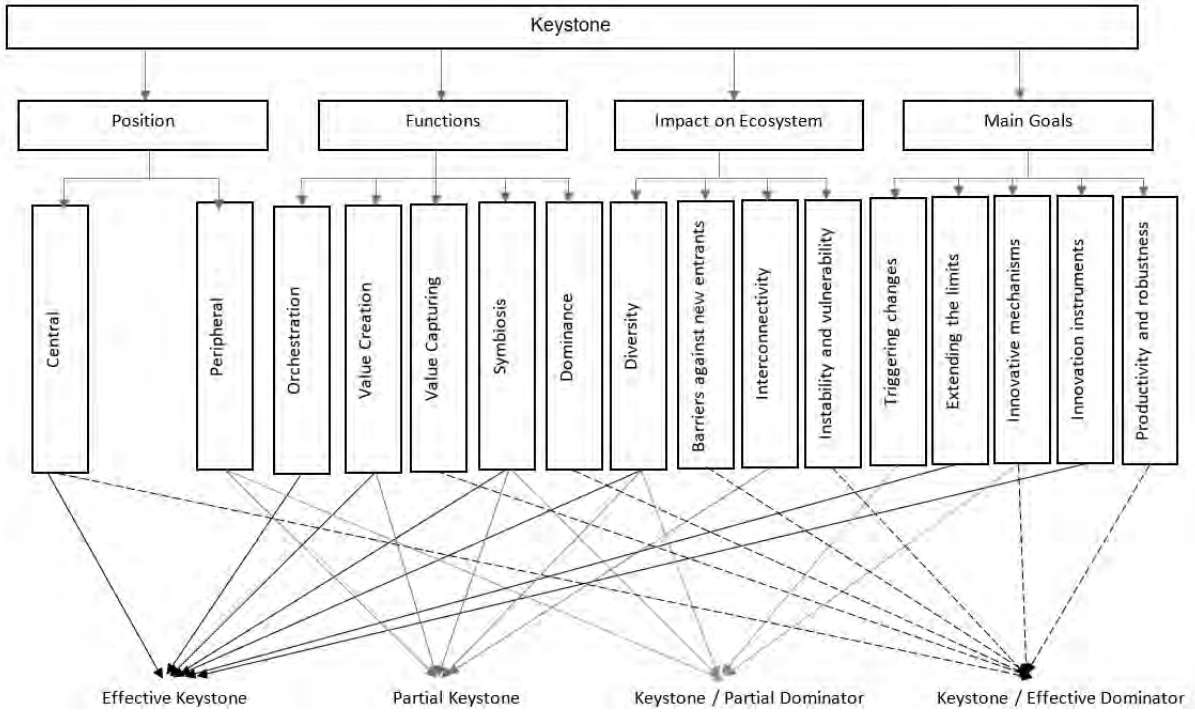

Figure 2. Aggregated keystones competitive behaviors

Automotive Industry and Electromobility Ecosystem

At global level automotive industry is perceived as the most profitable and traditional one. From this point of view the emergent ecosystems usually are closed type, highly concentrated on the dominance

of the actors, their presence and visibility (Donada and Attias, 2015). As analysis unit for competitive behaviors illustration was chosen the electromobility ecosystem. Due to modularization within the automotive industry Galateanu (Avram) and Avasilcai suggested that an electromobility ecosystem should comprise three layers: product, infrastructure and integration services layers. Each layer comprises different actors in terms of business models and developed products. Thus, Zulkarnain, et.al (2014) identified the types of actors who compose an electromobility ecosystem.

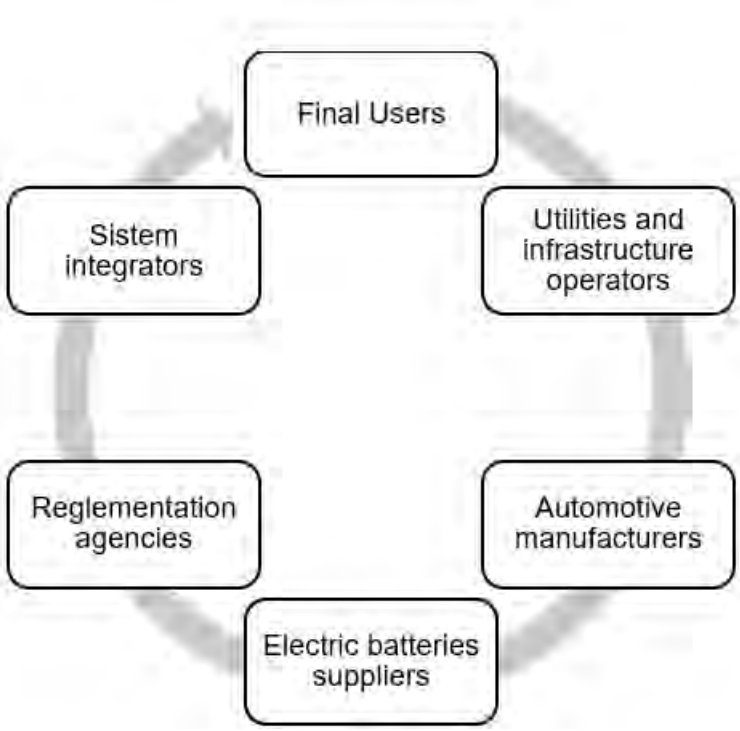

Figure 3. Electromobility ecosystem's actors (Zulkarnain et. Al, 2014)

Keystones' behaviors within electromobility ecosystem

In order to illustrate the competitive behaviors of keystones within an electromobility ecosystem there will be provided examples from automotive industry from the actors' point of view.

Effective keystones - As electromobility ecosystem encompasses collaborations among actors within different industries. Ever since connected vehicle concept was developed the use of Information Technology innovation increased so that automotive manufacturers could develop autonomous vehicles. From this point of view Attias and Mira – Bonnardel (2017) define as effective keystone within electromobility ecosystem the American giant Google, as their software instruments are widely used within automotive industry. However, the same function can be perceived also by automotive manufacturers in case of industrial platforms, which can serve as basis for further products development (Sturgeon, Van Biesebroeck and Gereffi, 2008). The central positioning of those actors depends upon the formed alliances between automotive manufacturers, such as General Motors – Ford or Nissan – Renault. Those alliances practically forced the assimilation within their network of the suppliers from the automotive industry (Sturgeon, Van Biesebroeck and Gereffi, 2008). However, the monitoring and orchestration of the ecosystem was strictly dominated by governmental agencies in terms of specific set of rules established for automotive manufacturers. As new technologies arose, by establishing collaboration with innovative automotive players, such as Tesla, through partnerships and alliances, the manufacturers ensured the mutually beneficial relations (Galateanu Avram and Avasilcai, 2016). This aspect is also emphasized by car – 2 – go service provided by alliance Daymler – Bosch which was particularly relevant for regional development (Spath, Rohracher and Von Radecki, 2016). The use of artificial intelligence or soft computing techniques is of the major importance for automotive manufacturers and it needs to include actors from different industries, the fact which favors the diversity of the ecosystem's members (Gusikhin, Rychtyckyj and Filev, 2007).

Partial Keystone - This competitive behavior can be understood in terms of specific initiatives, such as Green eMotion project. In order to ensure the actors interconnectivity this project is monitored by EMI Group, which comprises a coordination committee formed from representatives from automotive manufacturers, equipment suppliers and actors from other industries (EMI Group, 2018). In the same position, peripheral one, is placed the internet provider which ensures good communication and interconnectivity between members of this initiative (Zwirlein and Barlag, 2015). The value created through this initiative is concretized by the development of a specific marketplace which contributes to the creation of electromobility infrastructure. The key feature of the marketplace is to grant access to all actors within electromobility ecosystem. Zwirlein and Barlag (2015) suggest that service providers as well as specialized operators from external business networks ensures the communication channels and contributes to the symbiosis between ecosystem's members. For example, utilities operators have a great influence on interconnectivity between ecosystem's members: automotive manufacturers, clients and service providers.

Keystone / Partial Dominator - This competitive behavior is especially relevant nowadays as automotive manufacturers became aware of the increasing attention for car – as – a – service. Seign and Bogenberger (2012) assign this behavior to utilities providers as they act as attractors in relations with the customers. However, within the electromobility those operators do not occupy central position. Similar role can be perceived by internet providers who indirectly trigger the changes for automotive manufacturers. The use of smartphones and online payments applications are triggering factors which impose to automotive manufacturers to adapt their offerings and products (Seign and Bogenberger, 2012).

Keystone / Effective Dominator - According to Sadeghian et.al (2012) the state can adopt this behavior as these actors can dominate the electromobility ecosystem through established rules, such as tax policies, potential financial resources allocation, such as National Plan for Decarbonized Vehicles in France which supports the transition to green energy usage (The French Association for Hydrogen and Fuel Cell, 2016). Basically, it encompasses the use of hydrogen cell complementary with electric batteries technologies. Electromobility dominance can be perceived also by energy operators, who occupy a central position within infrastructure layer. These actors should innovate and adapt own infrastructure in order to create charging points for electrical vehicles (Sadeghian et.al, 2012). According to EMI report the energy operator can create the barriers for new entrants through increased cost with provided energy. This fact forces automotive manufacturers to increase the price for their electrical vehicles (Pandazis, et al., 2015). As for final users, the energy operator imposes the charging timeline. For example, ENEL from Italy dominates the electromobility ecosystem through: payment alternatives, swapping batteries technology and created charging infrastructure (ENEL, 2018). Pandazis et.al (2015) provides the example of collaboration between DG Energy and Eurelectric from Green eMotion project with governmental agencies and sustain that the result of this collaboration is that energy operators contribute to the development of electromobility ecosystem by providing smart charging infrastructure.

Conclusions and further research directions

Business ecosystem concept aims to highlight the need and importance of collaboration within dynamic and competitive environments. In scientific literature there was emphasized that ecosystems' development is closely linked to the members strategies. This paper aimed to highlight the keystone strategy adopted within automotive industry. Based on aggregated competitive behaviors and evidence from the existing literature there can be sustained that:

- Within electromobility ecosystem the keystone role can be adopted by a group of actors
- Some features are illustrated by actors from different industry
- The dominance within electromobility ecosystem is exert by service providers or utility operators
- In order to understand keystones competitive behaviors is essential to adopt a more specific point of view

The proposed framework can be further developed and applied in emergent ecosystems within creative industries where artistic and scientific creativity are entangled with industrial usage (Bujor and Avasilcai, 2014).

Acknowledgement

This work was supported by a grant of the Romanian National Authority for Scientific Research and Innovation, CNCS/CCCDI – UEFISCDI, project number PN-III-P2-2.1-PED-2016-0689, within PNCDI III

References

Attias, D. and S. Mira - Bonnardel
2017
"Extending the scope of partnership in the Automotive Industry between competition and coopetition" In D. Attias (eds) *The Automobile Revolution: Towards a New Electro - Mobility Paradigm* (pp. 69 - 86). Springer
Bosch-Sijtsema, P. and J. Bosch
2015
"Plays nice with others? Multiple ecosystems, various roles and divergent engagement models" Technology Analysis & Strategic Management: 1 - 15.
Bujor, A. and S., Avasilcai
2014
"Creative entrepreneurship in Europe: A framework of analysis" ANNALS OF THE ORADEA UNIVERSITY Fascicle of Management and Technological Engineering 23(13), 1: 151 - 156
Dedehayir, O., S. Makinen and R. Ortt
2016
"Roles during innovation ecosystem genesis: A literature review". Technological Forecasting and Social Change, in press, corrected proof
Den Harding, E. And T. Van Asseldonk
2004
„Business Ecosystems: A research framework for investigating the relation between structure, firm strategy and the pattern of innovation difusion". *ECOON - European Chaos/Complexity in Organizations Network*.
Donada, C. and D. Attias
2015
"Food for thought: which organisation and ecosystem governance to boost radical innovation in the electromobility 2.0 industry?" International Journal of Automotive Technology and Management, 15(2): 105 – 125
EMI Group
2018
EMI - eMobility ICT Interoperability Innovation Group: http://emi3group.com/organisation/
ENEL
2018
Europe wide Green e Motion initiative to pave the way for electromobility:
https://www.enel.com/media/press/d/2011/04/europe-wide-green-emotion-initiative-to-pave-the-way-for-electromobility
Fragidis, G., K., Tarabanis and A. Koumpis
2007
„Conceptual and business models for customer - centric business ecosystem". Digital EcoSystems and Technologies Conference: 94 – 99
Galateanu (Avram), E. and S. Avasilcai
2016
„Framing the Competitive Behavior of Niche Players: The Electric Vehicle Business Ecosystem Perspective", Procedia Social and Behavioral Sciences, vol. 221: 342 – 351
Gawer, A.
2014
"Bridging differing perspectives on technological platforms: toward an integrative framework". Research Policy*, 43*, 1239 - 1249.
Gusikhin, O., N. Rychtyckyj and D. Filev
2007
"Intelligent systems in the automotive industry: applications and trends". Knowledge and Information Systems, *12*(2): 147 - 168.
Hyrynsalmi, S., A., Suominen and M., Mantymaki
2016
"The influence of developer multi-homing on competition between software ecosystems" Journal of Systems and Software 111: 119 - 127.

Iansiti, M., and R. Levien
2004a
„Strategy as Ecology". Harvard Business Review, 68-78
Iansiti, M., and R. Levien
2004b
„The Keystone Advantage: What the New Dynamics of Business Ecosystems Mean for Strategy, Innovation , and Sustainability" Harvard Business School Press Boston, MA:
Moore, J.
1993
Predators and Prey: The new ecology of competition. Harvard Business Review, 71(3): 75 - 86
Pandazis, J.-C., K., Weber, S., Albertus, C., Hahn, S., Crucius, H., Hinrichs, H., B., Lebrun, G. Bernard, J.M. Reaves, H. Aichmaier, B., Fuchs and G. Coppola
2015
"Electro - mobility - Interoperability Challenges". Brussels: eMI³ c/o ERTICO
Peltoniemi, M. And E., Vuori, E
2004
Business ecosystem as the new approach to complex adaptive business environments. Tampere: Frontier e-business Research
Sadeghian, S. M., Thebert, F., Leurent and P., Sajous
2012
"Actors' position and inclinations towards the electromobility system in France" Procedia Social and Behavioral Sciences, 48: 516 - 526.
Scaringella, L. and A., Radziwon
2017
"Innovation, entrepreneurial, knowledge, and business ecosystems: Old wine in new bottles?" Technological Forecasting & Social Change, in press
Seign, R. and K., Bogenberger
2012
"Prescriptions for the successful diffusion of carsharing with electrical vehicles" Conference on Future Automotive Technology Focus on Electromobility. Munchen
Smith, D.
2013
"Navigating risk when entering and participating in a business ecosystem". Technology Innovation Management Review: 25 – 33
Spath, P., H. Rohracher and A., von Radecki
2016
"Incubment actors as niche agents: The german car industry and the taming of the „Stuttgart e-mobility region". Sustainability 8: 1 - 16
Sturgeon, T., J., Van Biesebroeck and G., Gereffi
2008
"Value chains, networks and clusters: reframing the global automotive industry". Journal of Economic Geography 8: 297 - 321.
The French Association for Hydrogen and Fuell Cell
2016
"Developing Hydrogen for the French Economy: A prospective study". Paris: AFHYPAC.
Van Schalkwyk, F., M., Willmers and M., McNaughton
2016
"Viscous open data: the roles of intermediaries in an open data ecosystem". Information Technology for Development 22(1): 68 - 83
Yang, S. H.,C., Nam and S., Kim
2018
"The effects of M&A within the mobile ecosystem on rival's shareholder value: The case of Google and Apple". Telecommunications Policy 43: 15 - 23.
Zwirlein, A. and H., Barlag
2015
"EV integration in Smart Grids – Glossary". European Commission FP 7
Zulkarnain, Z., P., Leviakangas, T., Kinnunen and P. Kess
2014
"The electric vehicles ecosystem model: construct, analysis and identification of key challenges". Managing Global Transition 12(3): 253 - 277

STUDY ON DEVELOPING THE MANAGERIAL STRATEGY AIMED AT IMPLEMENTING THE CHANGE IN ARCHITECTURAL SPACE

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Abstract

Purpose *– elaborating a managerial strategy aimed at implementing the change in architectural space.There are presented the essential objectives underlying the structuring research and the research tools in correlation with the environment in which the architectural organization operates, marked by intense changes of the requirements, opportunities and restrictions. Presenting the main areas of impact and the possible utility of the research, such as the structural management system, the services and products of architecture, the process of innovation in architecture and the management performance.*

Methodology/approach *- The main tool used (questionnaire AS II "Attitude towards change" Ticu Constantin "Psychological evaluation of personnel", 2004) has been selected because the architectural organization is in a period of intense transformations and must react to the new changes from the environment, as well as to the restrictions, requirements and opportunities that occur.*

Originality/value *– The study, by design, is exploratory / descriptive, explanatory and predictive. A program of measures designed for managerial development orders / guides the obtained results towards performance and competitive development.*

Key words: *strategy, change, management, performance, architectural space*

1. Research goals

1.1. Essential questions

The essential questions in structuring a support study in drafting a strategy for implementing the change in the Romanian architectural space, refer to the following issues:

- To what extent the relationships / interrelationships of the change management from architecture produce the optimal of the resistance process to change?
- How much / little can be affected the organizational managerial capacity of implementing a change?
- How can be correlated the dual aspects (change - development) through a competitive management, resulting from a change?
- What is the individual performance dispersion in the architectural management and to what extent their summing produce valences of business excellence?

1.2. Research methodology

To find the answers to these questions there were addressed various research methods, including the structural research, which uses primary data type obtained through interviews and questionnaires.

Through the questionnaire AS II "Attitude towards change" (drawn up by Ticu Constantin and published in "Psychological evaluation of personnel", 2004) adapted for architectural organization, I

identified the subjects' attitude towards change, the attitude of acceptance or rejection of the changes occurred during the transformations that take place in the institution.

This questionnaire was selected because the architectural organization is in a period of intense transformation and is part of a comprehensive development process that must respond to the new changes in the environment, as well as to the restrictions, requirements and opportunities that occur. For their part, the people from the architectural organization must change as well and they need to increase their knowledge, to tackle new tasks, to improve their level of competence, to change their work habits, values and attitudes towards the working mode in the organization. Basically, there can be no real change in the organization, without a change of attitude for each individual that operates in this community.

The lot consists of 140 subjects that operates within different organizations and that for several years are under the influence of transformations that occur in the civil society and in the institution which they belong.

2. Study concept

The study, by design, is exploratory / descriptive, explanatory and predictive. A program of measures designed for managerial development orders / guides the obtained results towards performance and competitive development.

The management, resistance to change and organizational change are conceptual reference vectors through which it becomes possible the analysis activity (of environment, necessity and resistance to change).

Environmental analysis and the need for change is made through a survey, using a questionnaire with relevant topics: architectural vision, architects missions, managerial values / competences

3. Areas of possible impact of the study findings

Areas of potential interest and impact are found in the structural management system. Managers can be individual or group, at higher / lower levels. The managers from the higher levels take the important decisions for the organization. Their sum forms the management system. It consists of structural elements and the relationships between them in order to achieve the targets. The structural elements can be organizational, methodological, informational, psychological, motivational, decisional.

These elements give the managerial components which are ordered into four main subsystems: 1) organizational; 2) methodological; 3) informational; 4) decisional. The main subsystems are also called managerial components (Figure 3.1)

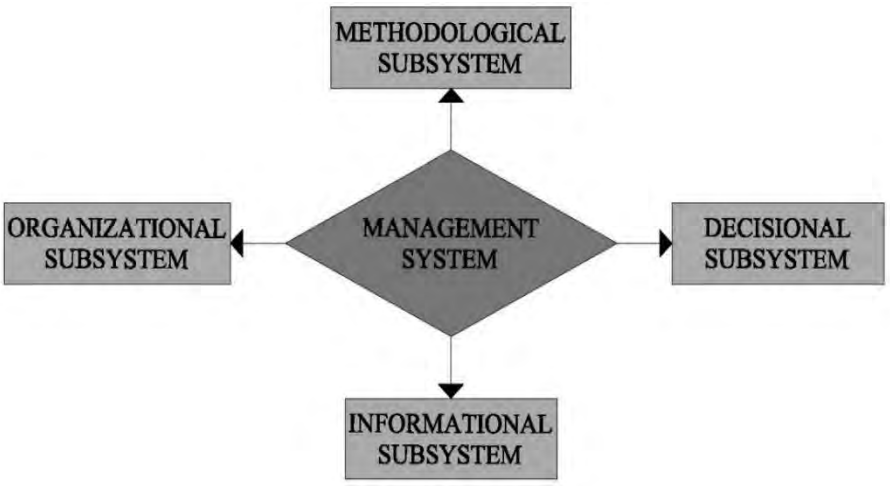

Figure 3.1 Managerial components. Construction after Cole (2004)

Another possible impact can be seen in the architectural services and products.

A schematic construction reveals the following picture:

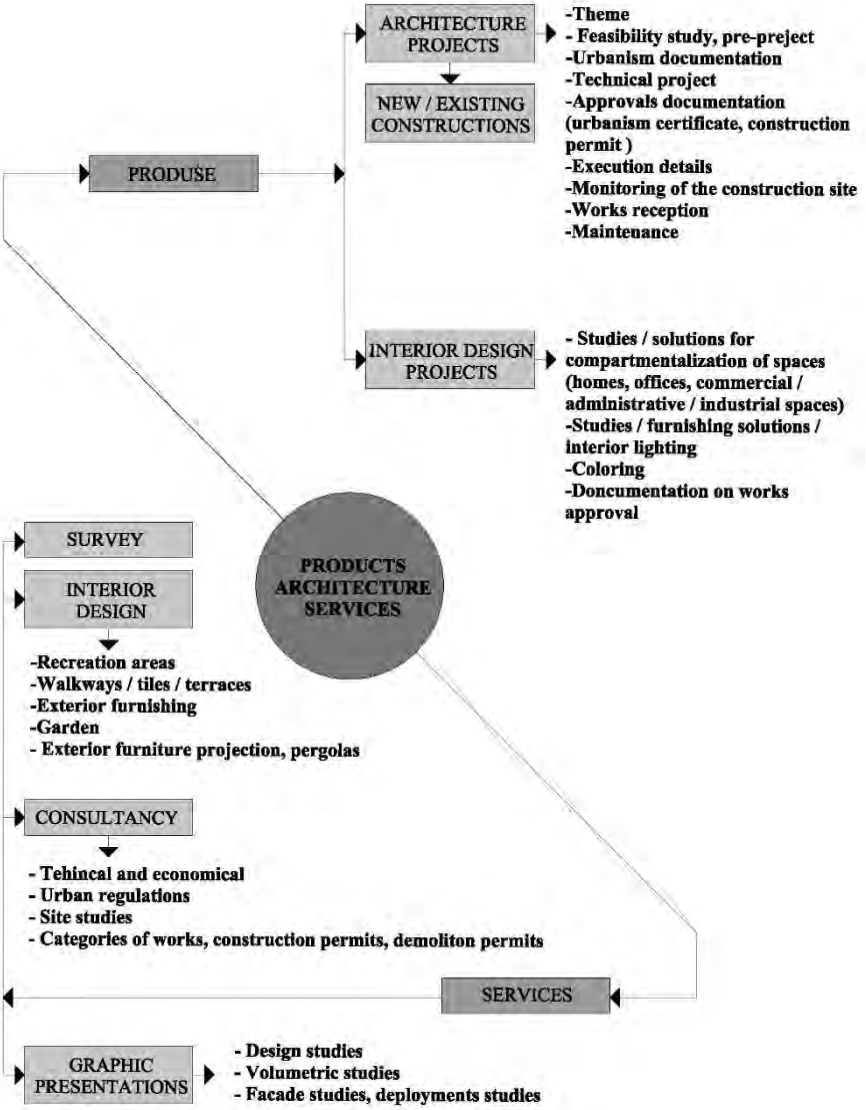

Figure 3.2 Architectural products / services. Schematic construction

The construction from figure 3.2 is just an schematically essay, imagined to synthesize a skeleton of classification the architecture products / services.

Perhaps a comparison with a tree trunk, in which there are captured only the main branches may be sufficiently in its essence. But in reality, all branches counts, including the smallest. As technology is advancing, the adjustments of the architecture to innovation become more surprising.

Returning to figure 3.2, there are required some clarifications regarding the architectural products / services.

Housing projects can be: collective / individual (PAC / PT / DE - project - construction authorization / technical / implementation). Urban studies (General Urban Plan / Landscaping Plan / Detailed Urban Plan) refers to urbanism as a “science of human settlements”, "which supports a controlled / effective and innovative development. By its content, this science „can optimize the human interaction”.

An argument of current importance is the design of buildings in compliance with the laws and the specific regulations / standards, correlating the functionality with durability and aesthetics. The trend is

ecological architecture. This implies spectacular constructions, “based on living organic materials”. It seems to be “science – fiction”, but there are dreams about reproductions of the nature (nature – the perfect architect) which will only be adjusted and limited in space. “By this way of building any architecture product will be the unique, organic and aesthetic”.

Interior fittings involve the “harmonization of the construction with the user”. Physical / aesthetic / psychological comfort involves customizing the interior space. By furniture, textures and colors, the user appropriates its affiliation, giving himself comfort and safety.

Continuing the observations on the future directions of the architecture tere is observed new approaches in the services area. Therefore, the webdesign is involved more effective in promoting the products / ideas in the context of globalization trends. There are important the sites with optimal and maximum market potential content.

Some highlights on the graphic design. It is important both in design and in graphic advertising. It is refered to approaches / goals / methods performed by vector graphics programs.

More recently it appeared on architectural services market the architectural photography. This can be “presentation” for web, prints (catalogs, leaflets, presentation brochures) and photos for menus (with important details for consumers / users / clients).

Going beyond the perimeter of the buildings, the innovation of the last decades (co-term) is the product design. Without this component, no product can not provide direct access to the market.

Study findings may be proved to be extremely useful in the innovation process (figure 3.3)

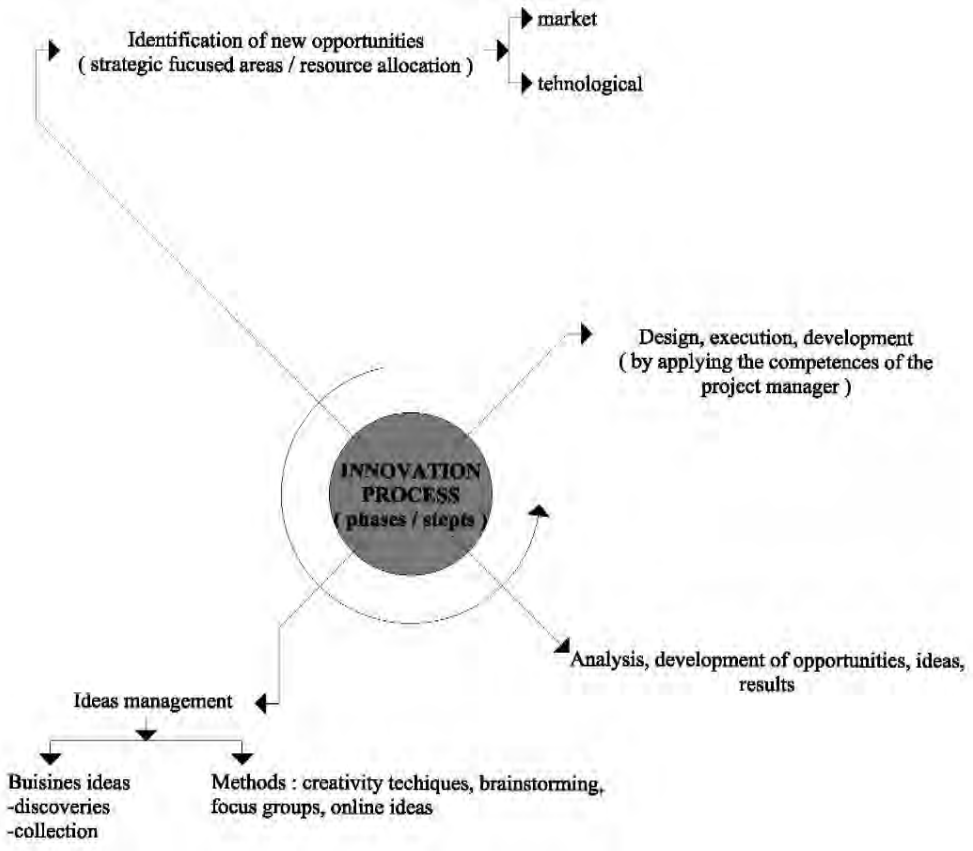

Figure 3.3 Phases / stages of the innovation process. Construction after (Tidd, 2001)

Colceag, Fl., Pavel, E., and others (2010) use terms like “dimensions of innovation management”. For all these, the creative and practical skills are necessary and important. (Colceag, Pavel, Visoru, Negruta, Dinea, Caragea, and Jinaru, 2010)]

Finally and in an era where **the performance indicatorri are implemented in all the systems / organizations that tend towards excellence, the proposed study may be useful in the performance management**.

Conceptually, performance can be defined as competitive result which produce organizational / interorganizational success and place the organization on the orbit of excellence in business. The performance management associates terms, strategic / operational / financial planning processes, quantification of performance results, human resources, programs / projects, indicators, risks, knowledge and optimizations.

In recent years the performance management has been developed, overcoming the classical limitations of collection / reporting of the indicators or "personnel management". The organizational performance measurement has been developed through "balanced systems", since the 80s (Neely, and others 2003), the correlation of the flows and transformations through "dynamic approach of the creation of value" and "the correlation of the financial aspects with the non financial ones".

As evaluative methods / models of the performance there were affirmed the "Balanced Scorecard", models of excellence in business EFQM (European Fondation for Quality Management), Malcolm Baldrige and performance prism". Marr (2008) correlates the vision and strategy with the financial perspectives, customers / consumers, knowledge - growth and internal processes on a "balanced dashboard" ("what is the balanced scorecard"). Although it is not achieved some important aspects of human resource and employee satisfaction or the organizational impact in the social environment, this method has the merit of having initiated the process of performance evaluation.

The main dimensions of organizational performance relates to finance, social and environmental impact, human resources, marketing. It comes to organizational performance, which through its market share, market concentration, development indexes of the brand / category and the penetration rate produce the satisfaction of the consumer / customer / user of architecture products / services / experiences.

Conclusions

The paper starts from the essential premises / questions in the processes of change that marks the economic environment in general and the architectural space in particular. There are also defined the directions and research methods. The main tool used (questionnaire AS II "Attitude towards change" Ticu Constantin "Psychological evaluation of personnel", 2004) has been selected because the architectural organization is in a period of intense transformations and must react to the new changes from the environment, as well as to the restrictions, requirements and opportunities that occur. For their part, the people from the architectural organization must change as well and they need to increase their knowledge, to tackle new tasks, to improve their level of competence, to change their work habits, values and attitudes towards the working mode in the organization. Basically, there can be no real change in the organization, without a change of attitude for each individual that operates in this community. There are also presented the main areas of impact and the possible utility of the research, such as the structural management system, the services and products of architecture, the process of innovation in architecture and the management performance.

References

Bertlef, J., Zagan, L., Butica, D., Oneata, C.
2014
Architects Order of Romania. Information System on the cost of the Architecture Design. Architect missions, Bucharest.
Boboc, I.
2009
The option for innovative strategies in the strategic management of public, nonprofit and political organizations of Romania, Life Quality Magazine, XX, no. 1-2.
Colceag, Fl., Pavel, E., Visoru, C., Negruta, M., Dinea, S., Caragea, Al., Jinaru, A.
2010
Technological retrofit and modernization program of Romania.

Ceocea, R.A.
2016
“Arhitectura in managementul economiei de piata romanesti”, Raport de cercetare Nr. 1 la teza de doctorat cu titlul “Managementul proceselor de dezvoltare a firmelor de arhitectura din Romania”, Universitatea Tehnica “Gheorghe Asachi”, Iasi.
Longman, Davenport, H.T., Short, J.
2007
The New Industrial Engineering: Information Technology and Business Process Redesign, ‘’Sloan Management Review’’, quote from Stan, C.S., Reengineering – a new management philosophy, Expert Publishing House, Bucharest.
Diaconu, M.
2011
Technological innovation: concept, process, typology and implications in economy, Theoretical and Applied Economics, Volume XVIII, no. 10 (563), pages 107-124.
Hulea, M.
2011
Project Management, class notes - Part I, Technical University of Cluj-Napoca.
Kotler, A.
2005
Marketing Principles, edition III (translation into Romanian)
Muthu, S., Whitman, L., Cheraghi, S.H.
1999
Business Process Reengineering: A Consolidated Methodology, Proceedings of The 4th Annual International Conference on Industrial Engineering Theory, Applications and Practice, San Antonio, Texas, USA, 1999
Rusu, C.
2003
Management of change, Economic Publishing House, Bucharest
Rusu, C., (coordinator)
2001
Technological change management, Sedcom Libris Publishing House
Tidd, J., s.a.
2001
Managing Inovation, New York, John Wiley & Sons, 2th Edition, 2001

DESIGNING A LAYOUT FOR AN ASSEMBLY LINE USED IN THE AUTOMOTIVE INDUSTRY

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Abstract

Purpose *– The article presents a model to apply a methodology for designing the layout for an assembly line to the automotive industry, to design an assembly line for an experimental product.*

Methodology *– There are presented in brief the 10 specific steps of the methodology of design of a plant layout and are highlighted the Lean Manufacturing concepts applied.*

Findings *– Using CAD tools, were conceived the modular and flexible workstations, and the modular means of inter-operational transfer, that allow the realization of different configurations of the lines. From design stage is ensured a minimization of activities without added value and a high flexibility of the workstations.*

Research limitations/implications *– The resulted layout plant allows the construction of this assembly line in laboratory conditions, experimentation on its functioning and determination of performance indicators.*

Practical implications *– The experimental validation of this methodology will allow the industrial system designer to use even from the design stage of plant layout, the concepts of Lean Manufacturing.*

Originality/value *– This study is part of a research project of the authors that has as aim the development of an improving methodology of production flows in automotive industry, by integrating modern methods, techniques and tools of production management.*

Key words: *assembly line, lean manufacturing, workstation design*

Introduction

Manufacturers in the automotive industry are in a strong competition requiring them to offer their customers a wide range of products of the highest quality, deadlines and lower prices. One way to achieve a competitive advantage is to adapt the production systems to mass customisation, so that they can provide the variety demanded by the customers while limiting their costs and maintaining their profitability (Limere, 2012).

Most of the production systems in the automotive industry are organized on production lines (layout by product). Machines or assembly workstations are arranged in the sequence of operation, successive operations being performed immediately adjacent to each other. The layout of the assembly line is typically dominated by the movement of the workpiece to which parts or items are assembled, and by the presentation and re-supply of the parts and items being used, making it difficult to separate line station layout from the planning of material handling, containment, and storage (Muther, 2015). The different models produced in line require the assembly of different part variants. As a consequence, workstations need to be supplied with many different parts, making it complicate the in-plant part flows and the layout line (Limere, 2015).

The facility layout affects the total performance of manufacturing system, such as, material flow, information flow, productivity, etc. Generally, about 20%-50% of the total operating expenses in manufacturing are attributed to material handling costs. Effective facility layout could reduce these costs by 10%-30% annually, and a good facility planning could also improve the material handling efficiency, reduce the throughput time, decrease the space utilization area of manufacturing system, etc. (Suo, 2012).

There are numerous studies for the facility layout in manufacturing systems, which depend on the object under investigation and its variation. Suo classified these derivations of the facility layout into six categories (Suo, 2012): product, process, equipment, production, manufacturing system and company. Any changes in items of these six categories can lead to facility layout problem.

In addition to these studies, a separate category is the one that applies Lean manufacturing concept to achieve the layout plant, with different approaches (Jia, 2011). Ohno introduced the core idea of Lean manufacturing (Ohno, 1988): the permanently work to eliminate the waste from the manufacturing process. Lean facility layout means to arrange the physical equipment within a workshop to help the facility work in a productive way. Thus, a good layout scheme would contribute to the overall efficiency of operations (Wilson, 2015).

From what was presented previously results that for production systems in the automotive industry, a way to eliminate wastes is to use the same equipment and production line for different product models and standardized works, so as to ensure a high flexibility for the workstations, and fewer activities with non-added value. Therefore, applying Lean concepts since the layout design phase of assembly lines is of major importance.

Research problem

This paper is part of a research project of the authors that has as objective the development of an improvement methodology of production flows from the automotive industry, by integrating modern techniques and tools of production management. In the paper „Methodology for designing the layout for an assembly line to the automotive industry using the Lean concept" (Gavriluţă, 2018), was presented the conceptual model that is at the base of the global methodology and describes the specific activities of the assembly line layout design.

In this paper, it is presented the applied methodology of layout design for an assembly line of an experimental product - a steering wheel, fig.1. This product is done in experimental purpose, and the production area in which the assembly line is made is the research laboratory. The entry data used to start the design process are: the product drawings, the characteristics of components to be assembled (material type, dimensions, mass, quality constraints etc.).

Fig. 1. The experimental product to be assembled (steering wheel)

Methodology

Taking step by step, the methodology previously mentioned, in this paper we will analyze, design and view the impact of integration of a layout of an assembly line of steering wheel.

The first step is the *Analysis of product*. Using the product drawings and the CAD software, it was made the Bill of Materials (BOM), fig. 2.

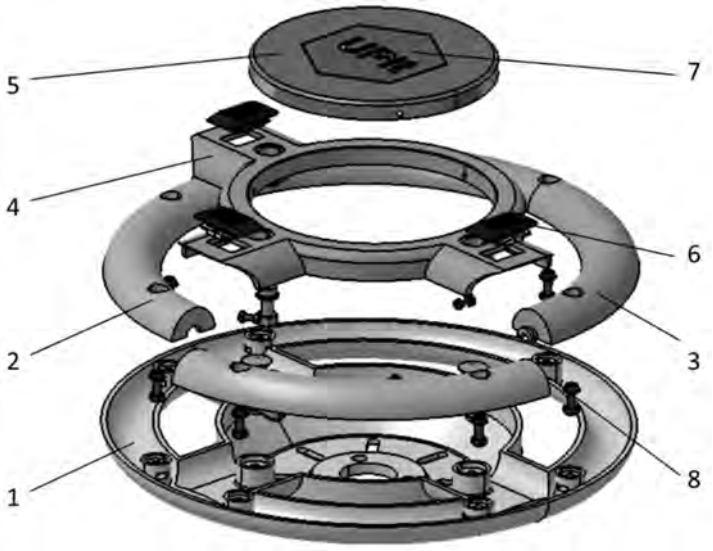


Fig. 2. The BOM of the product to be assembled (steering wheel)

It was made an analysis on the types of parts to be assembled, their characteristics as: material, weight, volume, need of special conditions due to any operator safety problem. The result is seen in table 1. In our case there were found 2 categories of parts, considering their mass and volume: under 0.005 kg, small volume and above this mass. There are no parts that need special handlings cause by volume constraints, however, a further analysis must be made considering also the cycle time and the reportativity of tasks for each operator.

Table 1. Characteristics of components

Components characteristics			Weight/ size category	Material
Components	Coef.	Weight (Kg)		
1	1	0,300	2	ABS
2	2	0,150	2	ABS
3	1	0,200	2	ABS
4	1	0,180	2	ABS
5	1	0,080	2	ABS
6	3	0,010	1	ABS
7	1	0,070	2	ABS
8	8	0.002	1	metal

The second step is *the analysis of the production environment.* Here the first analysis made is on the characteristics of workers specific to the region where the industrial system would be created. For this is considered as output a definition of workstation areas and their size, fig 3. As distinct areas of the workspace we find: (1) the main position of the operator during his work cycle; (2) the optimum space of movement for the operator; (3) the space where the operator could reach with a single step starting from the main position, this is important when arranging the supply of some secondary areas of work; (4) area of workstation where the operator can reach for part or for tools, it is in reach but with a discomfort or supplementary effort; area (5) is the main zone of work, where the operator hands would ideally move in the majority of work cycle.

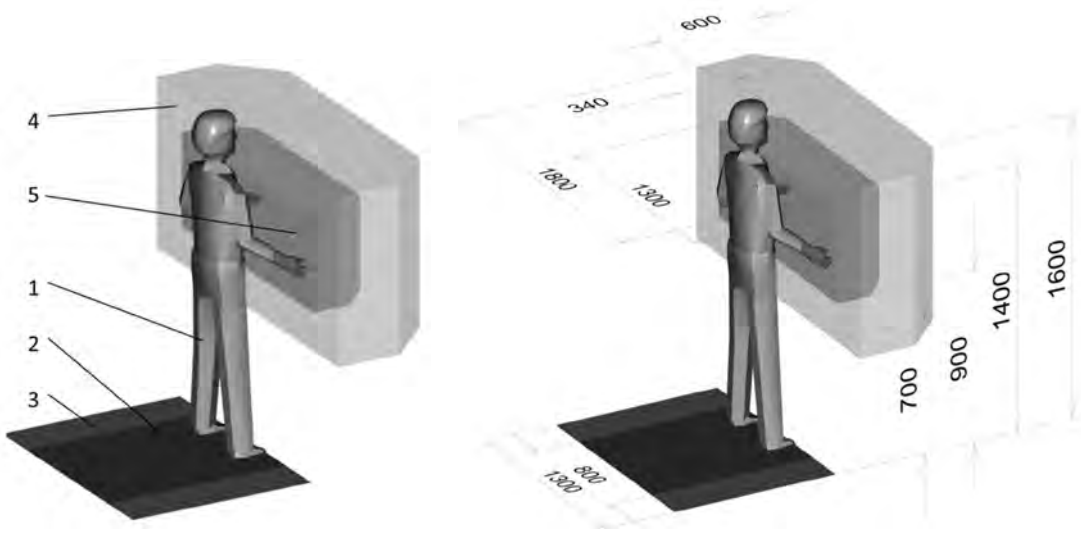


Fig. 3. Operator's workspace definition

A very important output of this stage is the general layout analysis, with the identification of available surfaces and the general flow schematics, fig.4. This allows us to define the entry and exit points of the line and logistic area, also to define the constraints of shape and size of the perimeter. As seen in our example, there is already an existing industrial system that has to accommodate our new layout proposal. Also, it is done an analysis of external factors that influence the process parameters and working conditions: sources of energy, temperature, humidity, noise etc.

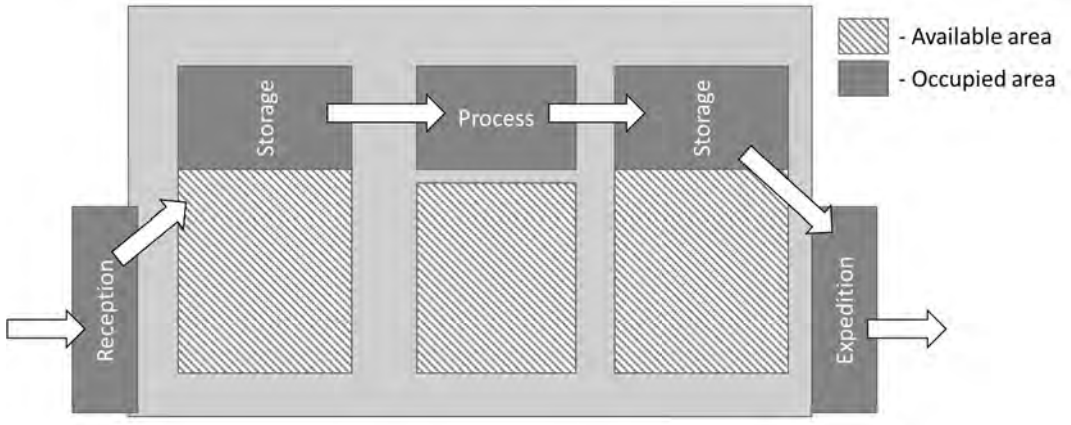


Fig. 4. Available surface and general flow schematics

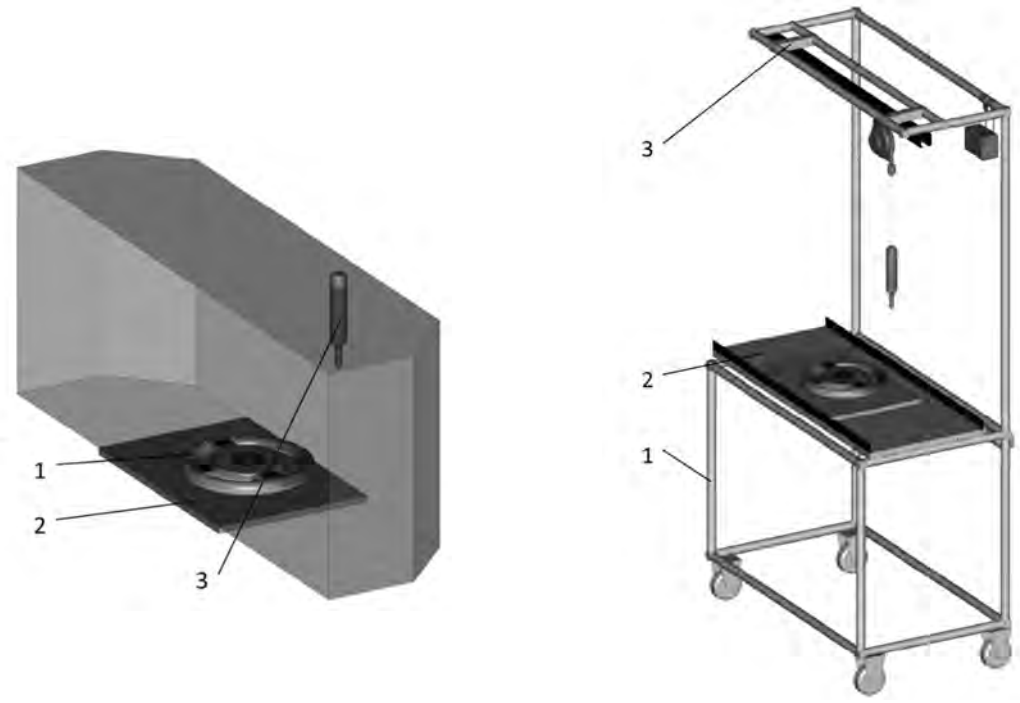
The third step is *the analysis of assembly process.* Considering the BOM, and needs of assembly priory identified, we designed the process steps. Another important entry data is the takt time of the clients and the estimation of variation of demand. In our example the takt time is of 2.2 min. with a high fluctuation. The conclusion being that is need to design a modular system that can be easily reconfigured to respond to the capacity fluctuation. Considering the lean concepts, another aim is to create a system with 0 setup that can respond directly to the need of the client in terms of diversity.

After the analysis of the type of process needed, the conclusions are that we have two types of operations, tightening and manual pressing. After considering the size and type of screws and assembled parts material, an electric screwdriver was chosen that meets the requirements. In table 2, we gathered the characteristics of each workstations, as execution time, setup, reliability data of the equipment (MTBF, MTTR), and the max stock needed between operations.

Table 2. Workstations characteristics

Workstation number	Duration [min]				Max stock
	Execution time, te	Setup time	MTBF	MTTR	
1	2	0	5.000	10	1
2	1,9	0	5.000	10	1
3	2,1	0	5.000	10	1
4	1,75	0	5.000	10	1

The design of the elements independent of the supply method is the forth step of the methodology. This starts from positioning the product to be assembled in the base of the ideal area of work, fig.5.a. The steering wheel (1) is positioned on a platform than ensured the position during the assembly operations (2) and the electrical screwdriver (3) is positioned in a position of easy reach of the operator. In fig. 5.b. is presented our result of this design, the preliminary workstation. It was decided to construct it from a modular frame (1), this is on rollers, so it could be easily moved in case of layout reconfiguration. The workstation has a work table (2), and an upper frame (3), where could be installed the screwdrivers or other devices so they could be in the good reach of the operator.



a) b)

Fig. 5. Design of workstation independent elements

The fifth step is to *analyze the workstation supply.* Using the data from the analysis of product: size, shape and weight of the parts, also the data from the workstation independent elements and the information from the suppliers, are identified the methods of supply and are chosen the best packaging suited for that methods, table 3. In our example, the method of supply chosen is the supply on stock with a level of stock in the workstation of 3 hours. The transport to workstation is done with an electrical tractor that dose circuits of transport at each 2 hours.

The sixth stage is *the design of the elements of workstation dependent on the method of supply.* Considering the method of supply and the stock level in each workstation, the dimension of packaging, the number of parts in each pack and the number of components needed to be assembled per work cycle, it is determined the need of packaging from each component. In our example, the supply is made on supply racks, fig. 6. These have a modular frame (1), designed with rollers, in order to be easily moved in case of reconfiguration of layout. There are 2 levels of supply (2) and 1 level of empty pack

return (3). The levels are made of modular rolls rows that can be easily reconfigure to suit the dimensions of the boxes. The supply rack is designed to be in face of the operator, in the area of easy reach.

Table 3. Components and the packaging definition

Components characteristics			Packaging				Transport unit			
Comp	Coef.	Weight (Kg)	L (mm)	W (mm)	H (mm)	Parts/ pack	L (mm)	W (mm)	H (mm)	Packs/ TU
1	1	0,300	600	400	200	15	1200	1000	145	25
2	2	0,150	400	300	200	20	1140	950	650	40
3	1	0,200	400	300	200	20	1200	1000	145	40
4	1	0,180	400	300	200	25	1200	1000	145	40
5	1	0,080	400	300	200	80	1200	1000	145	40
6	3	0,010	400	300	200	700	1200	1000	145	40
7	1	0,070	400	300	200	100	1200	1000	145	40
8	8	0.002	300	200	90	800	1200	1000	145	60

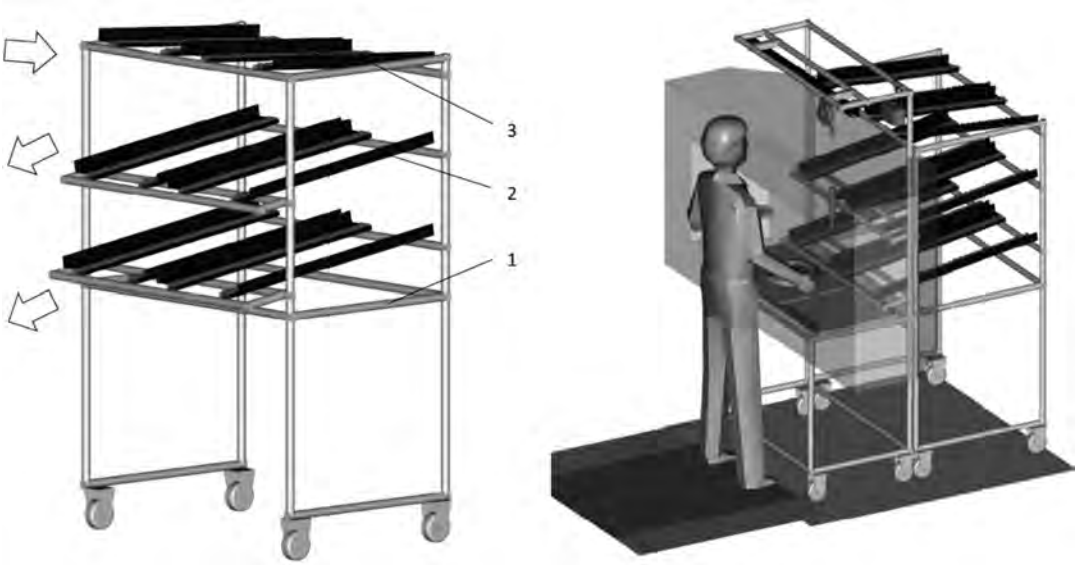


Fig. 6. Design of supply dependent elements

Fig. 7. Design of transfer system linking the workstations

The seventh stage is *the choice of transfer means between workstations.* WIP level is minimum between workstations, and also the weight of the steering wheel and the assembly plate allows us to choose a very flexible transfer method, fig. 7: a mobile assembly plate (3) that would move on rollers between the workstations and on the workstations, a fixed size module of conveyer (1), a roller surface (2) on the frame of the workstation (4). All this design makes the reconfiguration of layout really easy to do, and also assures a good working position for the operator and for the product.

The eight stage is *the design of the workstations.* This is a compilation of the elements previously design, fig. 8: dependent or independent of the method of supply and that includes also the means of transfer decided. Placing all the workstations together we can dimension the transfer modules and re-design certain features in case is needed. In this stage an important role has the data from the general flow analysis that define the entry and exit points of the production perimeter. The final layout of the assembly line must respect the available area and must respect the given performance targets.

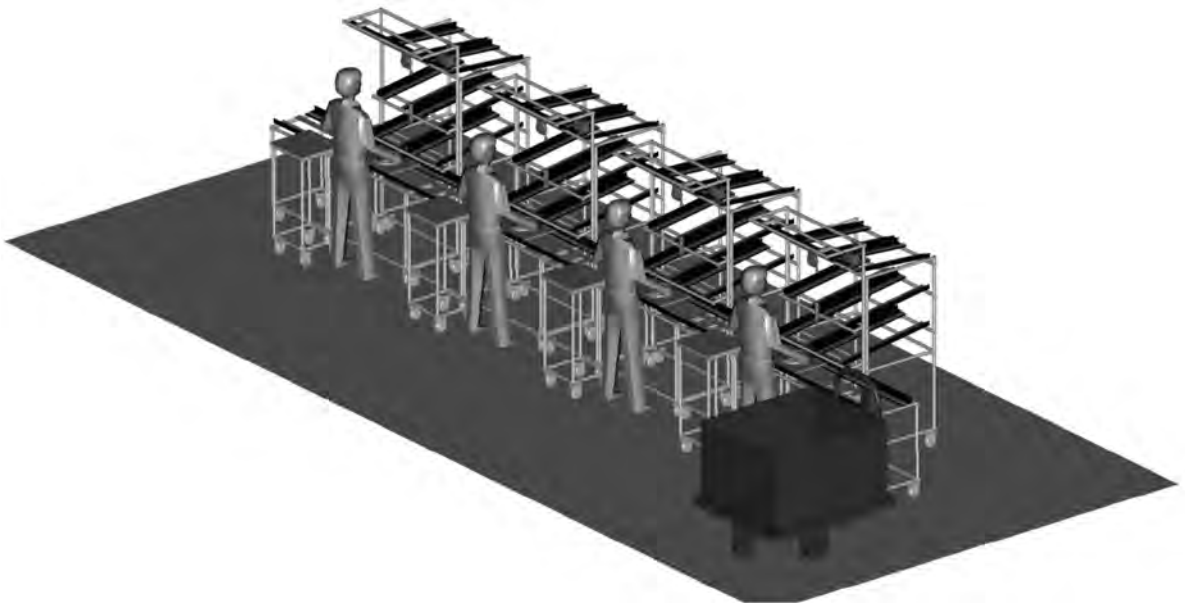


Fig. 8. Design of workstations, considering all the elements

The ninth stage is *the design of logistic area.* The entry data are the available area and its characteristics, the supply method, level of stock and means of handling. All these help design an area of storage, fig. 9 and determine the means needed.

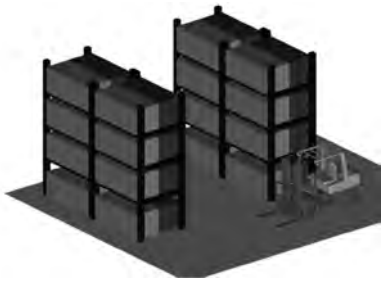


Fig. 9. Design of logistic area

The final stage is *the design of the production system.* In this stage, the two areas previously designed: production and logistics, are integrated in the general layout of the building fig. 10. In this stage are considered, the strategy of development on long term (increase/ decrease of capacity) for each element of the layout fig. 11, and also the relative position to all social and technical annexes (toilets, canteens, medical points etc.).

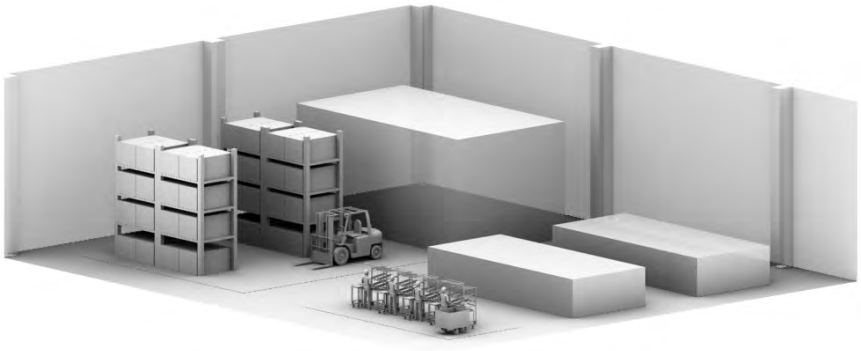


Fig. 10. Design of industrial system (overview)

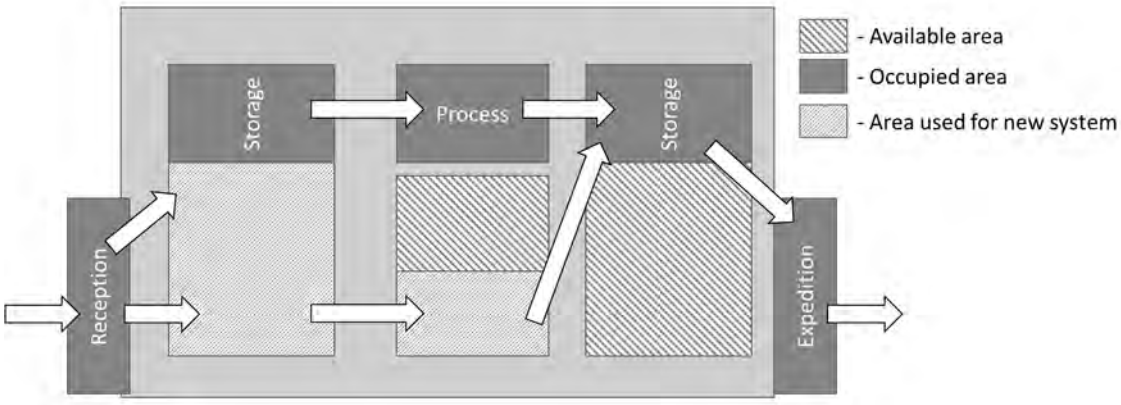


Fig. 11. Design of industrial system (general layout and flow)

Findings

Considering the methodology for designing the layout for an assembly line to the automotive industry proposed by the authors (Gavriluţă, 2018) and the results obtained by applying it to make, in laboratory conditions, an assembly line for an experimental product (steering wheel), the following are noticed:

- The steps followed in the actual design of the experimental product (steering wheel) assembly line are correctly linked in the proposed methodology;
- The data needed in this design are numerous and from different categories (product design, technology design, industrial system concepts, ergonomics, production management), but the realization in laboratory conditions of this production line imposed the use of experimental data and not industrial ones;
- In the realization of the activities specific to the methodology of line design, it was placed a high importance on the respect of standards and norms, specific for work ergonomics, logistic processes and safety of workers and also on the integration of Lean Manufacturing concepts. Therefore, by using CAD instruments, were designed the modular and flexible workstations, and also the modular inter-operational transfer means, that allow different configurations of the layout. Also, these workstations ensure a minimization of activities with no added value and a high flexibility, appreciated by the diversity of products that can be made on the line and also by the reduce time of setup.
- The layout resulted for the experimental product (steering wheel) assembly line, allows its use in the experimental laboratory, this facilitating the physical realization of it, the further experimentation of its functioning and the real measurement of its performance indicators.

Conclusions

In this paper, was presented on brief the mode of application of the methodology of designing the layout for an assembly line to the automotive industry (Gavriluţă, 2018), for the assembly of the experimental product - steering wheel. Were followed all the specific activities of the methodology, the focus being on the respect of standards and norms specific for work ergonomics and logistic processes, and also on the use of Lean Manufacturing concepts. It was resulted that the followed steps in the realization of the experimental product (steering wheel) assembly line were all correct and in a well enchained manner in the proposed methodology.

The obtained results, based on the developed methodology, the workstations – modular and flexible and the plant layout, will be physically put in place in the laboratory and the functioning of the line will be validated experimentally, this allowing to reach a higher level of TRL (Technology Readiness Level), during the research.

The study will continue by designing and constructing other assembly line configurations, which will be obtained by increasing the product diversity or by a different spatial configuration of the assembly line and the experimental realization of them. This will allow the calculus of performance indicators of the functioning of the line, and also the improvement of its functioning by application of Lean Manufacturing methods.

Acknowledgments

This work was supported by a grant of the Romanian Ministry of Research and Innovation, CCCDI – UEFISCDI, project number PN-III-P1-1.2-PCCDI-2017-0446 / 82-PCCDI-2018, within PNCDI III.

References

Gavriluţă, A., Niţu, E., Gavriluţă A., Belu N., Rizea A.
2018
“Methodology for designing the layout for an assembly line to the automotive industry using the lean concept”, In Proceedings of the RMEE2018 - Performance Management or Management Performance
Jia, Z., Lu, X., Wang, W., Jia, D., Wang, L.
2011
“Design and implementation of lean facility layout system of a production line”. International Journal of Industrial Engineering. 18(5) 260-269
Limere, V.
2012
“Optimising part feeding in the automotive assembly industry: deciding between kitting and line stocking”. International Journal of Production Research. 50(15) 4046-4060
Limere, V., Landeghem, H.V., Goetschalckx, M.
2015
“A decision model for kitting and line stocking with variable operator walking distances”. Assembly Automation. 35(1) 47–56
Muther, R., Hales, L.
2015
Systematic Layout Planning (Fourth Edition). Management & Industrial Research Publications, Marietta, GA, USA
Ohno, T.
1988
Toyota Production System, Beyond Large-Scale Production. Productivity Press Portland, Oregon, USA
Suo, X.
2012
Facility Layout, 405-432, Chapter in “Manufacturing System”, Edited by Dr. Faieza Abdul Aziz, INTECH, http://www.intechopen.com/books/manufacturing-system/facility-layout
Wilson, L.
2015
How to Implement Lean Manufacturing (Second Edition), McGraw-Hill Education, USA

THE IMPLEMENTATION OF FUZZY-BASED TECHNIQUES METHODS IN THE COMPETENCY BASED PROCESS OF HUMAN RESOURCES SELECTION

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Abstract

Purpose *– The developed system in this paper becomes a very useful tool for the selection of the workforce.*

Methodology/approach *- Multi-criteria decision-making system for the evaluation of candidates in the selection human resources process.*

Findings *– Fuzzy sets can be successfully implemented as a method of selection human resources through a multi-criteria decision-making system*

Research limitations/implications *– Applying this model makes selection more performing process*

Practical implications *– This model can be adapted and used in practice*

Originality/value *– Fuzzy sets implementation in the selection human resources process*

Key words: *Fuzzy sets, selection human resources*

Introduction

The process of providing the human resources for an organization involves the carrying out of specialized recruitment and selection activities and, after finding the suitable candidate, of the activities related to his or her integration.

The staff recruitment process seeks, attracts and identifies potential candidates whose characteristics are as closest as possible to the available job. As far as the staff selection process is concerned, this is a post-recruitment stage, the source of candidates for selection consisting, in fact, in the recruited candidates. By the staff selection process, the organization aims at harmonizing, even overlapping the physical, professional and psycho - intellectual abilities of the selected candidate with the requirements of the available job. This overlap is essential for the firm but it is also important for the candidate that applies for the respective job.

The process of human resources selection

The filling of a job by an unsuitable employee has major negative effects on the firm, more and more studies confirming the direct connection between selecting the suitable candidate and his or her subsequent work performance, with impacts on the effectiveness and efficiency of the firm. From this point of view, Pilbeam and Corbridge (2006) state that “Inappropriate selection decisions reduce organizational effectiveness, invalidate reward and development strategies, are frequently unfair to the candidate and can be distressing for the managers who have to deal with unsuitable employees.”

At the same time, an erroneous selection also affects the candidate, whose effort, skills, abilities, competencies and even time could be better harnessed to a job or an employer that can challenge and exploit his or her potential to a greater degree.

Another important aspect of staff selection is related to the fact that a person that is selected does not represent an absolute certainty of the performance obtained in his or her position as a new employee of the company. From this perspective, the integration at work has a significant role in achieving the individual performance materialized in a set of elements meant to harness the features of the new employee, of his or her integration in the company and of supporting him or her during the course of his work.

The staff selection is performed by empirical or scientific methods depending on: the type of the employer, the vacant job, the characteristics of the work environment etc. The scientific methods are those that provide the whole process with a higher level of success. These are represented by tests (assessing the skills, the intelligence, the personality etc.) and interviews, of which the most important and widely used is the selection interview.

It should be mentioned that the selection of human resources as a complex process consisting of several stages is accepted. For example, A. Manolescu (2003) delimits a rigorous sequence of stages. The essence of the whole process and also the most important step is the face-to-face selection interview, this being the moment when the candidate can be "revealed", offering, as well, the opportunity of a discussion about the job, requirements, responsibilities etc., being, also, the most appropriate moment for the delimitation of the framework of collaboration and for the negotiation of its conditions.

In practice, the companies do not strictly respect the theoretical models and formalize their own selection processes according to their specifics, needs, types of jobs or groups of jobs etc. Also, the types of interviews and the way in which they are conducted are customized.

At the same time, in the practice of human resources, the classical interview is perceived as having a limited character in the candidate's evaluation as it has a number of limits resulting from the fact that:

- it is subjective (being influenced by the interviewers' perception)
- it is reactive (the candidate's behaviour is partly influenced by the interviewer's behaviour)
- it does not ensure validation through future work performance (due to the lack of knowledge regarding the candidate's attitude, motivation etc.).

The selection of human resources by evaluating the individual competencies

These issues have generated a trend highlighted by Schippmann (2000) that directs the selection of human resources to competency-based models. This implies a high emphasis on job analysis, on the competencies needed to carry out tasks performantly and the undertaking of the responsibilities stated in the job description. A good job analysis starts with the required competencies and, mostly, with their definition. In defining competencies, there are used both universal, generic models, and models that fit the specifics of the organization. The generic ones have the advantage of low costs generated by their implementation but neglect the specific aspects that may influence the selection results.

It is considered that the competency models are, theoretically, always incomplete (Hayes, Rose-Quirie, Allinson, 2000) as it is impossible to detail thoroughly the component elements of a competency, the latter being a multi-level combination of behaviors, abilities, personality factors and motivation. In order to analyze and evaluate competencies, the levels of each competency are quantified, and, where this quantification is not possible, the interviewer generates his or her own benchmarks of categorizing certain behavior.

The competencies resulting from the job analysis represent the basis on which the questions in the selection interview are structured, they being formulated so as to grasp the competencies as fully as possible. Also, the type of questions is tailored in accordance with the type and complexity of the vacant job. The questions can be: open (that support free communication), closed (that offer the possibility to choose the answer from a series of proposed answers) or semi-closed questions (that offer the possibility of choosing answers but also propose the solution of a personal variant of answer). It is considered that the open questions have a higher degree of subjectivity given by the evaluator's personal interpretation of answers, but they are the ones that provide the candidates with the opportunity to express themselves, generating reactions and behaviors specific to them. By the help of a system of evaluating the obtained answers, it is provided an interview result that offers wide possibilities of validity of the selection through the subsequent performance of the future employee.

The competency-based evaluation process is grounded on cognitive and perceptual aspects that have a greater degree of imprecision caused by the associated individual perceptions. The processing of this imprecision can be successfully performed by using fuzzy sets theory, by which candidates can be evaluated in the selection process, and decisions can be made to employ the most suitable candidates for the jobs concerned.

The development of a decision-making system based on fuzzy sets for staff selection in a project company

In the present study, we aimed at obtaining a fuzzy model that can be used in selecting the candidates for a job, using a competency-based selection model. The proposed model was made for the case of an entry-level mechanical engineer. The selection has also as source the data resulted from the recruitment process by the help of a fuzzy model. In order to achieve the model, the competencies required to fill such a job were analyzed and the levels of competency to be evaluate were considered to be the following ones:

- Knowledge of design software, part of the technical competencies;
- Communication abilities that are part of the learning abilities category - learn to learn;
- Teamwork skills are part of entrepreneurial skills.

The structure of the interview, through the administered questions, allows the interviewer to assign a value on a scale of 1 to 10 for each of the three levels.

The fuzzy sets based decision-making system of SELECTING the candidates

In order to implement the multi-criteria decision-making system of candidates evaluation used in the process of recruitment, the following stages are taken:

A. Defining the criteria (the input values in the decision-making system) according to which the candidates' evaluation will be performed.

The criteria according to which the candidates' evaluation will be performed are:

1. The degree of knowledge of design software (Computer Aided Design), notation: Nivel-Cun-CAD;
2. Communication abilities, notation: Abil-Com;
3. Teamwork abilities, notation: AMF.

B. The variation domains of input values are defined:

The domain for *Nivel-Cun-CAD* is the one from (1)

$$Nivel\text{-}Cun\text{-}CAD:\ D_{Nivel\text{-}Cun\text{-}CAD} = [0, 10] \quad (1)$$

The domain for *Abil-Com* is that from (2)

$$Abil\text{-}Com:\ D_{Abil\text{-}Com} = [0, 10] \quad (2)$$

The domain for *AMF* is that from (3)

$$AMF:\ D_{AMF} = [0 ,10] \quad (3)$$

C. Defining the linguistic variables associated with each input value

The linguistic variable *The Degree of knowledge of design software* (*Nivel-Cun-CAD*) is associated with the input value *The Degree of knowledge of design software*.

The linguistic variable *Communication Abilities (Abil-Com)* is associated *w*ith the value *Communication Abilities.*

The linguistic variable *Teamwork Abilities (AMF)* is associated with the value *Teamwork Abilities*

D. Defining the linguistic terms associated with each input value

The linguistic terms associated with the input linguistic variable *The Degree of knowledge of design software* are those from the relation (4):

$$Nivel\text{-}Cun\text{-}CAD:\ TL_{Nivel\text{-}Cun\text{-}CAD} = \{vs,\ s,\ Md,\ H,\ VH\} \quad (4)$$

The linguistic terms associated with the input linguistic variable *Communication Abilities* are those from the relation (5):

$$Abil\text{-}Com:\ TL_{Abil\text{-}Com} = \{vs,\ s,\ Md,\ H,\ VH\} \quad (5)$$

The linguistic terms associated with the input linguistic variable *Teamwork Abilities* are those from the relation (6)

$$AME:\ TL_{AME} = \{vs,\ s,\ Md,\ H,\ VH\} \quad (6)$$

where: *vs* - very small; *s*: small, *Md*- Medium, *H*- High, *VH*: Very High.

E. Establishing the membership associated with each linguistic term corresponding to the input values

In the case of the variable associated with the three input values, all the linguistic terms have been associated with Gauss-type membership functions (Figure 1).

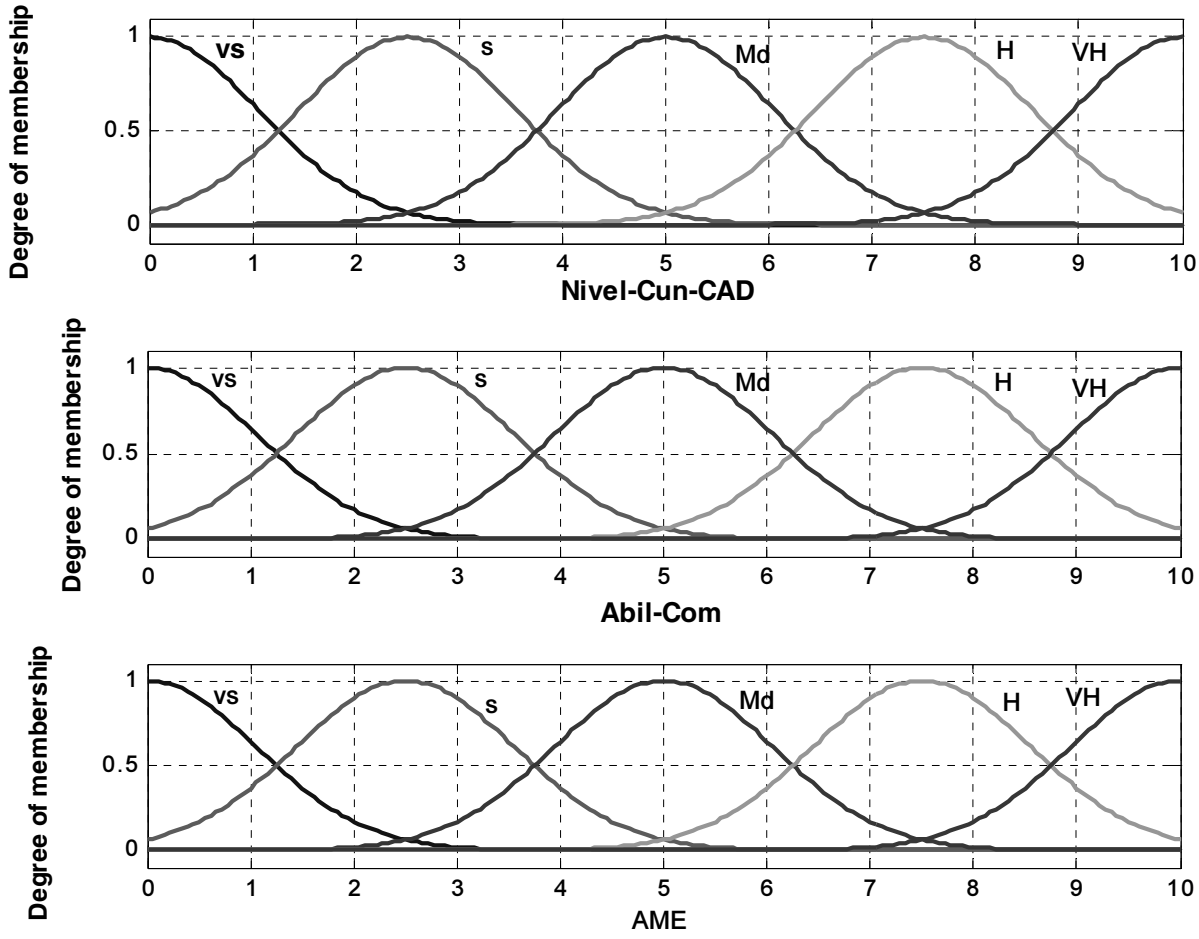

Figure 1. Input Variables. Membership Functions.

E. Defining the output value of the decision-making process

The output value of the decision-making process *The Achieved Score,* notation: *SCOR*

F. The domain of variation of the output value is:

$$SCOR: D_{SCOR} = [0, 10] \quad (7)$$

G. Defining the linguistic variable associated with the output value

The output value *The Achieved Score* is associated with the linguistic variable *The Achieved Score–SCOR*.

H. Establishing the linguistic terms associated with the output value

The output value SCOR is associated with the linguistic terms presented in (8).

$$SCOR: TL_{SCOR} = \{vs, s, Md, H, VH\} \quad (8)$$

where: *vs* - very small; *s*: small, *Md*- Medium, *H*- High, *VH*: Very High.

I. Establishing the membership functions associated with each linguistic term in the case of the output value

To the linguistic terms corresponding to the output value, the following Gauss-type membership functions are assigned (Figure 2).

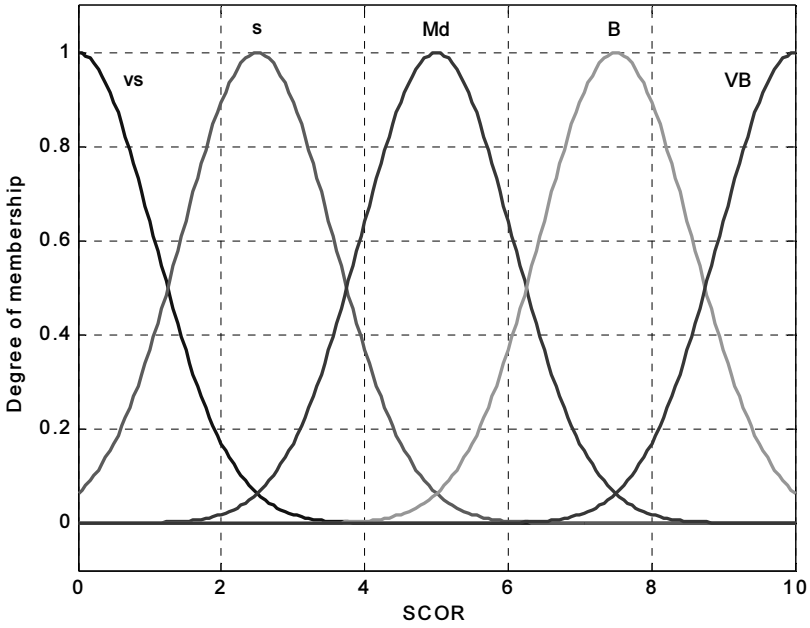

Figure 2. The output value. Membership functions.

Establishing the method of connecting the different values of the membership function

The connection between the input values and output value is performed by MIN-MAX method, the result being the 125 rules of inference under the form of those presented below.

1. If (Nivel-Cun-CAD is vs) and (Abil-Com is vs) and (AME is vs) then (SCOR is vs)
2. If (Nivel-Cun-CAD is vs) and (Abil-Com is vs) and (AME is s) then (SCOR is vs)
3. If (Nivel-Cun-CAD is vs) and (Abil-Com is vs) and (AME is Md) then (SCOR is s)
4. If (Nivel-Cun-CAD is vs) and (Abil-Com is vs) and (AME is H) then (SCOR is s)
5. If (Nivel-Cun-CAD is vs) and (Abil-Com is vs) and (AME is VH) then (SCOR is Md)
6. If (Nivel-Cun-CAD is vs) and (Abil-Com is s) and (AME is vs) then (SCOR is vs)

……

60. If (Nivel-Cun-CAD is Md) and (Abil-Com is s) and (AME is VH) then (SCOR is B)
61. If (Nivel-Cun-CAD is Md) and (Abil-Com is Md) and (AME is vs) then (SCOR is s)
62. If (Nivel-Cun-CAD is Md) and (Abil-Com is Md) and (AME is s) then (SCOR is Md)
63. If (Nivel-Cun-CAD is Md) and (Abil-Com is Md) and (AME is Md) then (SCOR is Md)
64. If (Nivel-Cun-CAD is Md) and (Abil-Com is Md) and (AME is H) then (SCOR is Md)
65. If (Nivel-Cun-CAD is Md) and (Abil-Com is Md) and (AME is VH) then (SCOR is B)

……..

119. If (Nivel-Cun-CAD is VH) and (Abil-Com is H) and (AME is H) then (SCOR is B)
120. If (Nivel-Cun-CAD is VH) and (Abil-Com is H) and (AME is VH) then (SCOR is VB)
121. If (Nivel-Cun-CAD is VH) and (Abil-Com is VH) and (AME is vs) then (SCOR is Md)
122. If (Nivel-Cun-CAD is VH) and (Abil-Com is VH) and (AME is s) then (SCOR is Md)
123. If (Nivel-Cun-CAD is VH) and (Abil-Com is VH) and (AME is Md) then (SCOR is B)
124. If (Nivel-Cun-CAD is VH) and (Abil-Com is VH) and (AME is H) then (SCOR is VB)
125. If (Nivel-Cun-CAD is VH) and (Abil-Com is VH) and (AME is VH) then (SCOR is VB)

The decision-making system implemented in Fuzzy Logic Toolbox of Matlab® is presented in Figure 3.

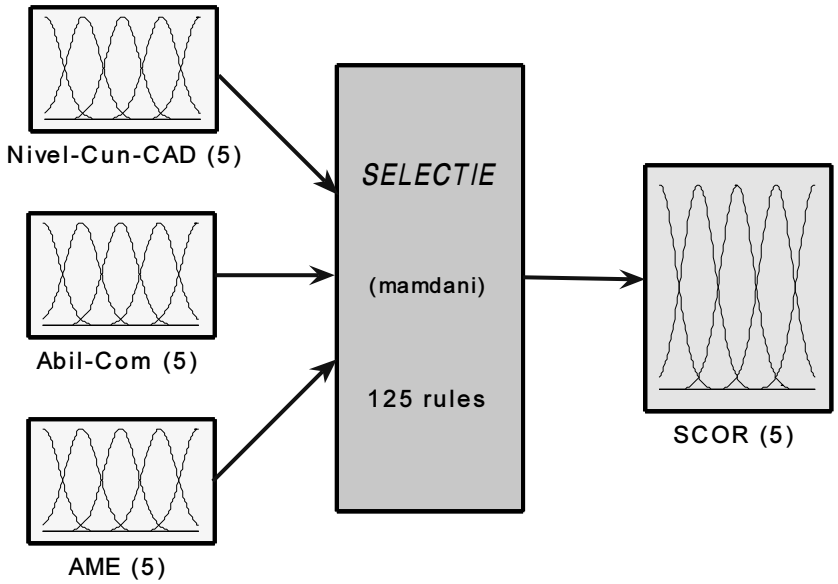

Figure 3. The decision-making system SELECTIE1 implemented in Fuzzy Logic Toolbox of Matlab®

Figure 4 displays the variation surface of the output variable (SCOR) in relation to two input variables: *Nivel-Cun-CAD* and *Abil-Com.*

J. Establishing the defuzzification method

For defuzzification, it will be used the centre of gravity method, one of the most applied method in practice.

The firm value of the output value resulted from the defuzzification process will constitute the value *The Achieved Score*.

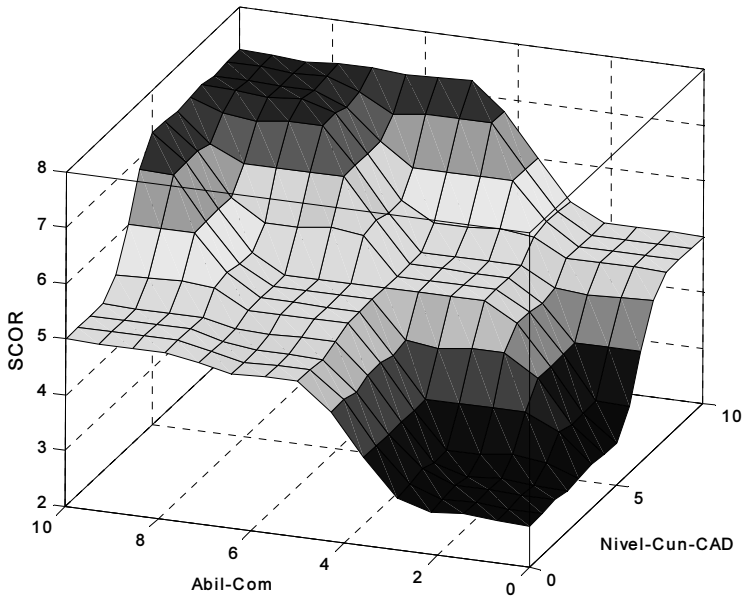

Figure 4. The variation surface.

In order to establish the result of the evaluation, a set of programs in Matlab® environment has been conceived. These programs allow:

1. The introduction of firm values of the output values:
   - The Degree of knowledge of a projecting programs (Nivel-Cun-CAD);
   - Communication Abilities (Abil-Com);
   - Teamwork Abilities (AMF).
2. Establishing the output value *The Achieved Score (SCOR)* by using the decision-making system SELECTIE.fis.

The graphic interface generated by the main program INTERFATA.m is displayed in Figure 5. This is intended for the user (assessor).

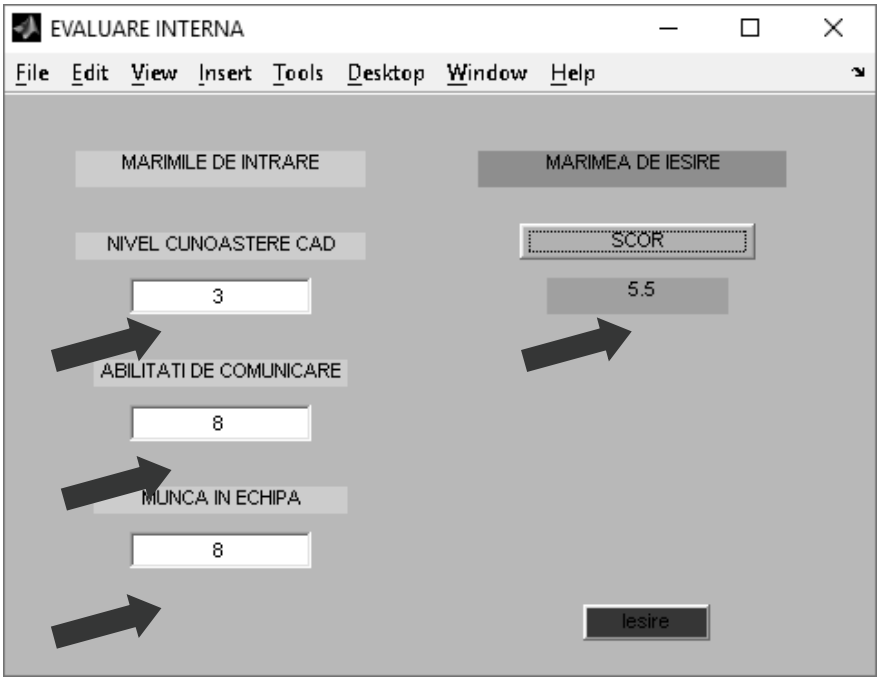

Figure 5. The evaluator's interface.

An example of system using is that presented in Figure 5. The user introduces the values for input variables:

- Nivel-Cun-CAD= 3;
- Abil-Com= 8;
- AMF= 8.

By activating the button SCOR I, it results the value of the output variable *The Achieved Score* = 5.5.

Conclusions

The fuzzy sets provide efficient solutions for the development of multi-attribute decision-making systems. The possibility of considering several criteria, some having divergent influences, represents the strength of such a system.

The developed system becomes a very useful tool for the selection of the workforce. This is all the more obvious so as the recruitment process can be done through fuzzy models which subsequently become the source of the fuzzy model of human resource selection. By using the two models in this way, the company that recruits and selects has obvious benefits related to the developing of human resources process. We also consider that the obtained data can be subsequently used in the employee's career to track his or her work performance.

References

Barron, J.J,
1993
Putting Fuzzy Logic into Focus,Byte, Vol. 18, No. 4, pp 111 – 118.
Bălaş, D.V.
2016
Gestiunea resurselor umane prin tehnici fuzzy- rezumatul tezei de doctorat, UBB. 2016
file:///C:/Users/user/Desktop/Mihaela%20TOPAN_rezumat_balas_timar_ro_2016-02-02_14-07-38.pdf, accesat la mai 2017
Hayes, J., Rose-Quirie, A., Allinson, C.W.
2000
Senior managers' perceptions of the competencies they require for effective performance; Implications for training and development. Personnel Review 29, 1, 92-105.
Kosko, **B**., **Isaka**, **S**.,
1993
Fuzzy Logic, Scientific American, Vol. 269, July, 1993.
Manolescu, A.
2003
Managementul resurselor umane, Ed. a 4-a, Ed. Economică, București, pg.292.
Pedrycz, **W**., **Gomide**, **F**.
2007
Fuzzy Systems Engineering. Toward Human-Centric Computing, IEEE Press, John Wiley & Sons.
Pilbeam, S. and Corbridge, M.
2006
People resourcing: Contemporary HRM is practice (3rd ed.). Essex – England: Printice Hall, pg. 142.
Schippmann, J.S., et al.
2000
The practice of competency modeling. Personnel Psychology, 53, 703 – 740.

FEATURES OF QUALITY MANAGEMENT IN HEALTH CARE, A DIABETES PROFILED MEDICAL INSTITUTION IN ROMANIA: CASE STUDY

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Abstract

Purpose: *This paper aims to evaluate the quality of management in a diabetes medical institution. Quality management in healthcare has a critical importance for the healthcare industry and for the patient.*

Methodology/approach: *We used a case study of The National Institute of Diabetes, Nutrition and Metabolic Diseases "N. Paulescu", using data from 2013 to 2017, available online on the Institute's website.*

Originality: *The originality of the article consists of the in-depth study of the specificity of the diabetes-specific sanitary institution.*

Keywords: *quality management, medical institution, diabetes*

Introduction

Diabetes mellitus is a major public health concern. In 2015 the global prevalence of diabetes was estimated to be around 9% among adults aged > 18 years, representing approximately 415 million subjects (IDF 2015). In 2017, the International Diabetes Federation estimated that around 425 million adults worldwide have diabetes (IDF 2017). For Romania, the results of the PREDATORR epidemiological study determined that the prevalence of diabetes in adults is 11.3% (Mota et al 2016).

It is well known that the majority of public hospitals in Romania is facing significant problems and are fighting hard to resolve them. The objectives of an improved healthcare system aimed at improving efficiency and increasing the capacity of healthcare providers for a better response to the needs of patients, health professionals and non-medical staff.

The management of health services is influenced differently by each category of actors involved: government, control of healthcare facilities, professionals and patients.

Unfortunately, in the healthcare system, there are consecutive losses, which generate enormous costs for society. These can be generated by ineffective medical services or technologies, substantial variations in performance, or other factors. The quality of medical services becomes a priority for healthcare providers, managers, patients, the government. (Minca, Marcu 2005,Cristescu 2017).

Human resources management is a critical component of hospital managers. The mutual values of any management plan are: protecting the health of all categories of population, respecting patients' right to choose a doctor and a healthcare unit, equal opportunities, guaranteeing the quality and safety of the medical act, ensuring broad accessibility to emergency services, ambulatory care facilities and hospital services, ensuring high standards of professional competence, and encouraging their development.(Curtiss 2008, Mendez 2017,Mirea et al 2017, Pituru et al 2015, Poiana et al 2017).

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Methodology

This a retrospective case study from 2013 to 2015 of the The National Institute of Diabetes, Nutrition and Metabolic Diseases "N. C Paulescu". The collection of statistical and financial data was done by consulting the Institute's website: http://www.paulescu.ro/, where they were available.(Cristescu 2017)

The National Institute of Diabetes, Nutrition and Metabolic diseases "N. C Paulescu" is a healthcare provider for both acute and chronic patients, in collaboration with the Bucharest Health Insurance Company (CASMB). Medical healthcare is provided by continuous hospitalisation, one-day hospitalisation or ambulatory care units. The hospital also offers emergency medical care 24/7, when needed. We offer advanced comprehensive therapy available for Type 1 and Type 2 diabetes and for all complications associated with diabetes. (Chowdhury Tahseen 2017). The hospital covers a full range of diabetes-related health care services, thereby providing comprehensive medical care. (OMS 2003, OMFP 2004, Pituru et al 2015). All clinicians, nurses and all other health professional have acquired high-performance medical knowledge, and a have good moral standing. Our research and education departments aim to advance and improve the health and well-being of our patients and their families.

Together with the continuous hospitalisation, we offer an ambulatory care unit, a pharmacy, a blood analysis laboratory, a radiology department, an anatomic pathology lab, a sterilisation compartment and a blood transfusion department. The proper functioning is ensured by many structures such as: the financial service, administrative service, the human resources management, the medical statistics department, the legal department. (Cristescu 2017, Mirea et al 2017, Poiana et al 2017).

The hospital is divided as follows: Department 1 of diabetes, nutrition and metabolic diseases (41 beds), Department 2 of diabetes, nutrition and metabolic disorders (55 beds), The Cardiology Department (9 beds), The Nephrology Department (17 beds) and The Hemodialysis Department for endstage renal disease (10 dialysis machines). (Cristescu 2017)

Results

Concerning the first 10 months of 2015, 13.664 patients were treated in the National Institute of Diabetes, Nutrition and Metabolic Diseases, as follows: 4209 in continuous care unit and 8754 in daily hospitalisation. (Cristescu 2017) (Fig 1)

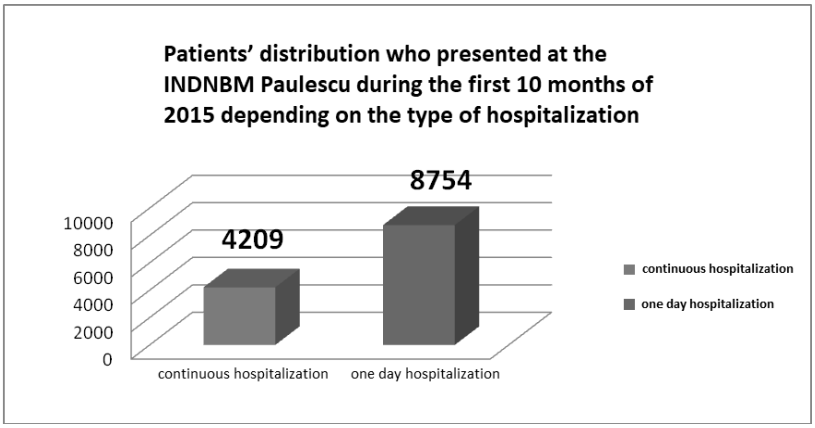

Figure 1. Patients' distribution during the first 10 months of 2015

124.000 ambulatory care consultation and over 6670 consultations in the Emergency room were provided and 223.300 medical tests were performed. (Cristescu 2017)

In 2014, out of the total of 5608 patients hospitalised here, 42,1 percent were from Bucharest, while as in 2014 a lower percentage (30 percent out of 5895 patients) were from Bucharest. (Cristescu 2017) (Fig 2).

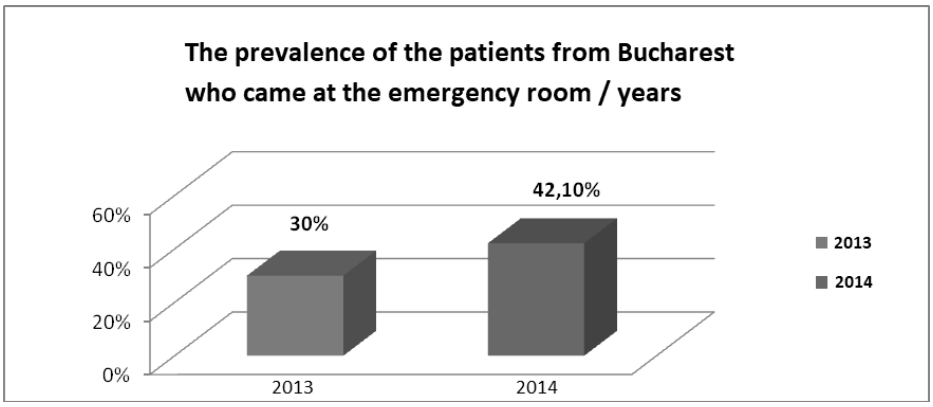

Figure 2. The prevalence of Bucharest patients

The hospital staff is composed of 83 physicians, 131 nurses, 57 auxiliary personnel, 21 technical, economic and administrative staff and 16 maintenance personnel and security staff. (Cristescu 2017) (Fig 3).

Figure 3. The distribution of staff categories

The professional level of the personnel is maintained through the participation in different specialisation and training programs, national and international conferences.

Activity indicators

During a relatively extended period of time, with certain stability concerning the hospital's total expenditures, there are some fluctuations concerning these expenditures, probably influenced by the number of patients and other characteristics.

At any time, the hospital staff, the drugs and sanitary materials represent over 50% of the hospital expense, whereas 40.35% is the hospital staff salaries (typical for small and medium hospitals), meaning that any cost control strategy needs to aim these 3 types of expenses. (Cristescu 2017, OMS 2003, OMFP 2004).

Quality indicators

The Concordance Index between admission diagnosis and discharge diagnosis is 72,3%, due to the associated pathology of emergency room hospitalised patients, that have a poor medical education, thus leading to this disparity.

The in-hospital mortality is below the national average (0.9%). There were no nosocomial infections reported and no complaints between 2015-2017. (Cristescu 2017, OMS 2003, OMFP 2004) (Fig 4).

The 24h in-hospital mortality is similar to the national average (probably due to the complexity of hospitalised patients).

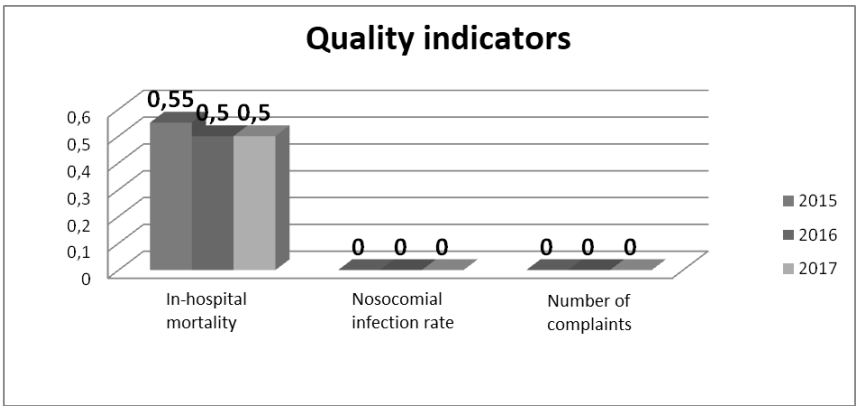

Figure 4. Quality indicators

Table 1. SWOT analysis (Alexandrescu 2013, Badea 2006,Cristescu 2017)

Internal Origin	
Strengths	**Weaknesses**
- reference for the diabetes network with recognised national and international activity - a clinical base for university courses and postgraduate education - main partner in different training projects for health professionals - highly qualified medical staff, opinion leaders in the field of diabetes - research and education activity that completes the medical act - professional and stable management team; - the most crucial institution in providing diabetes health care to residents across the country; - buildings and spaces with proper technical equipment, new equipment and medical devices; - high accessibility, convenient location - diversified structure and sophisticated medical services providing a high-quality and complex health care; - ambulatory care unit that provides integrated services; lack of debt; an integrated computer system; respecting patient rights; hotel conditions, diversified menus based on meal plans, control of nosocomial infections, efficient use of medication, accessibility facilities for people with disabilities; - staff availability in customized medical care	- lack of a bigger space; - old buildings with modest upgrading and low thermal comfort; - uncertainty of proporty rights for theambulatory care units; - the organisational structure that does not meet the needs of the population's medical services; - lack of efficient emergency transport means for the critical patient; - old medical equipment; - old utilities; - insufficient space for the development of high-quality medical act; - lack of a designated space for children with diabetes and medical staff specialized in infantile diabetes; - lack of an active research department; - lack of high-performance medical equipment (CT scan, IRM); - insufficient staff, an inadequate number of physicians; - low share of own revenues; - lack of partnership with the other private partners;
Opportunities	**Threats**
- possibility to access European funds for the development of optimal infrastructure, research and training; - the possibility of interacting with private operators through association to attract sponsorships/donations; - conducting research studies with foreign partners; - partnerships with international medical units to improve the professional performance of staff; - expanding the medical team by selecting the best resident doctors; - Practical use of National Health Programs.	- strong competition due to proximity to other medical facilities where many public and private hospitals operate; - the emigration of doctors and nurses; - overcharging medical staff; - low remuneration and inconsistency with medical performance; - under-financed specific services of the Institute in the context of rising medical services costs - reduced income of the population; under-financed health system; as CNAS will encourage primary health services, budget allocations for hospitals will decrease, thus increasing competition levels

Discussion and conclusions

A coherent strategy for developing and improving the medical act has to be established. The restoration of the material base, partially worn out and the need for investments in major technical repairs, reviewing the non-optimized functional circuits that obstruct the medical act and overworking the staff, all have a negative impact on the quality of medical services. The establishment of an Excellence Center for the installation of modern insulin devices (insulin pumps, continuous glucose monitoring systems) can assure a unique place of reference in the field of diabetes in Romania. (Alexandrescu 2013, Cristescu 2017, Minca, Marcu 2005).

Another significant aspect is the funding issue. Continuing to maintain this unfair financing system and delaying the uniformity of the tariff on the category of hospitals will slow the process of modernising the hospital. The Romanian state, as a mediator, must try to standardise the tax considering the complexity of the pathology treated in each hospital to ensure a fair distribution of public funding.

Until this goal is achieved, the only solution to face the daily needs is to channel the hospital management together with the medical staff to find other sources of funding than existing ones, expanding the range of medical services and non-medical that the hospital can offer.

In conclusion, we strongly feel that quality management in healthcare is a critical requirement for all healthcare organisations and that quality management must be patient-centered. Adapting and implementing standards and tools is the next step towards this goal. In conclusion, we emphasise once more that quality management in healthcare begins with the patient and should depend on his needs, therefore continually keeping up with patients' changing needs and demands.

References

Alexandrescu, D.
2013
Plan de management evaluarea spitalului Sanador din punct de vedere al calitatii, dr. Doris Alexandrescu - https://www.sanador.ro/wp-content/uploads/2013
Badea, E. et al.
2006
MANAGEMENTUL SPITALULUI - Şcoala Naţională de Sănătate Publică şi Management Sanitar - http://www.snspms.ro/UserFiles/File/ph_press/manual_pentru_cursul_de_management_spitalicesc_2006.pdf
Chowdhury Tahseen, A. et al.
2017
Managing adults with diabetes in hospital during an acute illness BMJ; 357 :j2551
Cristescu, V.
2017
Managementul calitatii – element prioritar de crestere a performantei institutului național de diabet, nutriţie şi boli metabolice „Prof. dr. N. C. Paulescu" 2015-2017
Curtiss, B. et al.
2008
Understanding and Improving Management of Inpatient Diabetes Mellitus: The Mayo Clinic Arizona Experience, Diabetes Sci Technol. 2(6): 925–931.
International Diabetes Federation
2015
The global picture, IDF Diabetes Atlas, 7th edn, 2015, Brussels, Belgium. Available from: http://www.diabetesatlas.org/, Accesed: 2016-01-08
International Diabetes Federation
2017
IDF Diabetes Atlas, 8th Edition, 2017, Available from: http://www.diabetesatlas.org/, Accessed: 2018-01-17
Mendez, C.E. et al
2017
Management of Type 1 Diabetes in the Hospital Setting, Curr Diab Rep. 2017 Sep 14;17(10):98. doi: 10.1007/s11892-017-0919-7.

Minca, D.M., Marcu, M.G.
2005
Sanatate Publica si Management Sanitar - Note de curs pentru invatamantul postuniversitar, Editura Universitara “Carol Davila”, Bucuresti
Mirea, L. et al.
2017
Efficacy of tigecycline treatment in severe and complicated clostridium difficile infection,FARMACIA Volume: 65 Issue: 4 Pages: 600-604
Mota, M. et al.
2016
Prevalence of diabetes mellitus and prediabetes in the adult Romanian population: PREDATORR study *J. Diabetes* **Vol**. 8, No. 3, pp 336-344.
OMS
OMS nr. 840/2003 pentru aprobarea Normelor metodologice de organizare şi exercitare a auditului public intern în cadrul Ministerului Sănătăţii
OMFP
OMFP nr. 252/2004 pentru aprobarea Codului privind conduita etică a auditorului intern, M. Of. nr. 128/2004
Pituru, S. et al.
2015
Malpractice and professional liability of medical personnel,
FARMACIA Volume: 63 Issue: 2 Pages: 318-324
Poiana, C. et al.
2017
Fracture risk assessment in patients with diabetes mellitus, JOURNAL OF CLINICAL DENSITOMETRY, Volume: 20 Issue: 3, SI Pages: 432-443

CREATIVE ECOSYSTEMS MODEL INNOVATION VIA CROWDSOURCING MODULES

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Abstract

Purpose *–This study aims to identify and illustrate how internal processes can be adapted to the requirements of a creative ecosystem through business model innovation using crowdsourcing modules.*

Methodology/approach *– The comparative analysis implies two parts: ecosystem stakeholders' unit and the value component. Two different frameworks were proposed and applied on two different creative platforms.*

Findings *– There are cases where actors define their business model using the crowdsourcing from stakeholders and value point of view.*

Research limitations/implications *– The use of marketplaces transform traditional businesses into innovative ones by using the power of different actors, thus the need for co-innovation within creative industries is accentuated.*

Practical implications *– Crowdsourcing marketplaces are of great interest for business model innovation within virtual environment.*

Originality/value *– Until now, no study has been conducted in Romania to refer to the use of crowdsourcing modules, especially in the creative industries. The value brought is materialized by identifying those aspects that help to understand the major differences in the definition and implementation of creative crowdsourcing platforms.*

Key words: creative industries, creative crowdsourcing, innovation*.*

Introduction

The concept of collaborative ecosystem aims at increasing the relevance of the links between different actors. By definition, an ecosystem can not be developed as long as there is no close collaboration and cooperation between the participating actors. Current theories state that key issues of open innovation are addressed when discussing ecosystems.

The use and usefulness of specific open innovation tools such as crowdsourcing within an ecosystem has been so far demonstrated by significant examples in the literature. From this perspective, this paper aims to identify and present examples of platforms developed by the creative industries as tools to promote open innovation through the use of crowdsourcing.

Business Models within Creative Ecosystems:

Specialty literature presents theories that include business models' approaching that can be embedded in an ecosystem environment, and whose utility has been repeatedly demonstrated by management researchers. According to Nielsen and Lund (2013), a business model portrays the coherence of the strategic choices which stimulates the handling of processes and relations which have a great contribution to value creation on different organizational levels: operational, tactical and strategic. While Nielsen and Lund (2013) defines six elements of a business model, taken from Chesbrough and Ronesbloom (2002) theory, and presented in figure one, Rasmussen (2007)

appreciates the importance of a business model in terms of three elements, namely: product or service development, price setting and cost of production.

Figure 1. The constituent elements of a business model according to (Nielsen and Lund, 2013; Chesbrough & Rosenbloom, 2002)

The importance of a business model innovation, aimed at increasing the performance of a company, as Lambert and Davidson (2013) highlight, is provided by both the use of techniques and the mechanisms of open innovation, especially when discussing the relationship between a company and other participants in the value network, hereafter referred to as actors. These collaborative relationships between actors determine dynamic changes that support value creation processes within an ecosystem, thus contributing to the transformation and co-evolution of the ecosystem business model (Rong, Patton, and Chen, 2018).

In this paper the authors have proposed to highlight how a creative ecosystem innovate using one of the most popular mechanism of open innovation, namely crowdsourcing. Thus, it is necessary to define both the creative ecosystem and the crowdsourcing.

The creative ecosystem refers to an entire system from which creative activities emerges, according to Harrington (1990), and it has been used more frequently since 2000, when it first appeared in BusinessWeek. The creative ecosystem is based on three fundamental elements: creative people, creative design, and creative environment (Harrington 1990). The involved creative people are the core of a creative ecosystem, and all three elements are connected through functional relationships which arise in the process of creative activities emerging, and lead to the value creation, as presented in figure two.

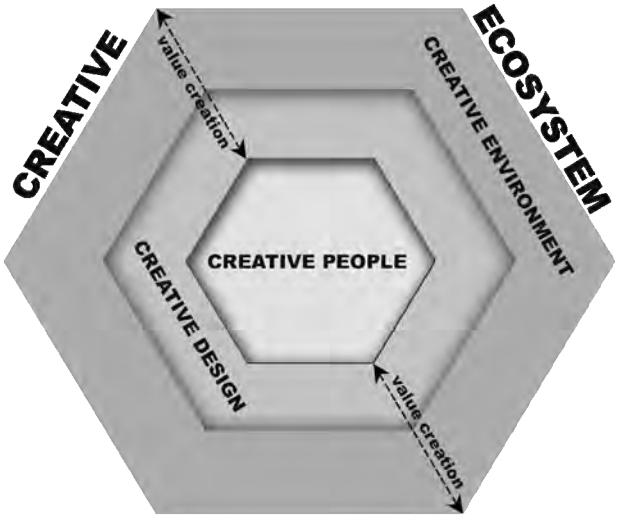

Figure 2. Creative ecosystem' fundamental elements, adapted from (Harrington, 1990)

For this research the approach of a creative ecosystem presented in the "The Creative Ecosystem of Ulster County, NY, and Environs" report, commissioned by the Community Creativity Foundation of Kingston New York (2008), will be taken over, as authors believe that it best fits the purpose of this paper. Thus, according to the report, the creative ecosystem refers to the local or regional set of dynamic interrelationships that establishes among: the creative artists, their audiences, and the infrastructure specially created to support creative artists, as the most appropriate way in which their work is brought to the attention of the public. The term of audiences must be understood as the community in which the creative artists live and work, serving in the same time as an elementary market for their activity and as an eventual source of involved engaged volunteers.

Crowdsourcing as Collaborative Mechanism

Crowdsourcing briefly defined as a fairly popular method nowadays that uses people around the world to help accomplish a particular task, has already been embraced by almost all industries to cope with market changes, align with new trends, and ultimately improve performance (Bujor and Avasilcai, 2018). In terms of crowdsourcing classification, there is currently no unanimously accepted one. In the literature there have been identified classifications that include even 10 types of crowdsourcing, but also 4 types of crowdsourcing. Regardless of their number, the most popular ones, as Howe (2008) reckons, are: crowd creation, crowd wisdom, crowd voting, and crowd funding.

Crowd creation, according to Howe (2008), refers to creative activities that require individuals and businesses to solve a particular dilemma, thus leveraging the ability and the opinions of a multitude of people to create new products, e.g.: Threadless, CaffePress, iStockPhoto, etc.. Crowd wisdom, as Howe (2008) highlights, tries to build on the knowledge of many people to solve problems, anticipate future results, or help guide corporate strategy, e.g. Innocentive, Yahoo Answers, Wikipedia, etc. In the case of crowd voting, the community votes on the idea or the favorite product (Howe 2008), generating the highest levels of participation (Keifer 2010) e.g.: American Idol, My Starbucks, Quirky, etc. The last but not the least, crowd funding is an alternative method of generating investment capital for companies and projects that do not fit into the pattern required by standard funding methods: Kickstarter, RocketHub, We Are Here, etc., the last two target creative projects/ businesses.

Even if the creative industry's strengths is creativity, recognizing that innovation today is both creativity itself and technology enhancement, more and more creative companies have also begun to gather ideas for innovation from direct customers or stakeholders through their involvement from the initial stages of the open innovation process. Thus, crowdsourcing is used today by creative businesses to overcome the challenges and opportunities they face daily. Consequently, the success of crowdsourcing, for example, as an open innovation strategy, encourages creative industries to consider creative co-production as a viable development option in all segments.

Thus creative crowdsourcing, term used to refer to crowdsourcing in creative industries, involves the use of creative tasks and usually provides creative solutions for problem solving, innovative solutions, and at the beginning it was illustrated by poster, publicity, and design contests.

Creative Ecosystem Analysis: Methodology

The creative ecosystem analysis proposed by the authors in this paper comprises of two main anchor points which are closely linked to the use of key features from crowdsourcing theory. Thus, the authors approach is based on stakeholder's point of view, and/ or value creation components.

The first anchor point is about specific actors who participate in the creative ecosystem and the analysis of their interaction by using crowdsourcing platform. As open innovation became an anchor point in business ecosystem actors' interconnectivity, the current research defined new types of complex structures. From this point of view platform-based ecosystems respond to the need of identification and illustration of emerging ecosystems stakeholders. Thus, in order to understand how crowdsourcing modules are used within a creative ecosystem, a framework for stakeholders' identification must be provided. This fact is sustained by collaborative business models from a business ecosystem point of view. These models provide valuable insights and highlight the major relevance of collaborative relations among participating members. Platform-based ecosystem model emphases the use of platform as an anchor point (Isckia and Lescop, 2014). According to Isckia and Lescop (2014) approach, platform owners should manage not only the innovation created in value or business networks but also provide control and continuous improving of their platform. Thus, platform

owners also can be seen as the key actors who propose specific collaborative mechanism (Rong, Patton and Chen, 2018). Collaborative business models can be described from stakeholders' point of view as: a community of actors (suppliers, clients, potential new members) affiliated to a specific platform, which contributes to the collaboration facilitation and value creation and generation (Hellstrom et al., 2015; Rong, Patton and Chen, 2018). Based on the above assumptions, the authors proposed a creative ecosystem stakeholder's identification model as presented in figure three.

Figure 3. Creative ecosystem stakeholder's identification proposed model

The second anchor point comprises specific elements of business model innovation theory applied to actors' practices, especially emphasizing the value created and distributed by using crowdsourcing platform. In this context, Al-Debei and Avison (2010) identified and defined four essential elements of a business model, namely:

- the proposed value: refers to the description of the value elements that is or will be offered to end users, which implies knowing the target segment to which the company is addressing
- the value architecture: illustrates in detail the organizational, and technological infrastructure and their configuration from an internal perspective; according to this element, a business model should illustrate the essential resources that an actor has to create value
- financing the value: provides information on cost and revenue structure, and also payment methods necessary for value proposition
- the value network: specifically reflects the position of an actor in the business network to which he/ she belongs; this dimension refers to relations established between actors and other stakeholders, aiming in the same time at knowing the competitive behaviors/ roles approached by actors in terms of value exchanged through collaborative and cooperative relationships.

Thus, from the value point of view highlighted by Al-Debei and Avison (2010), and other aspects identified by the authors in the theory, a value framework analysis model was also designed for this paper, as shown in figure four.

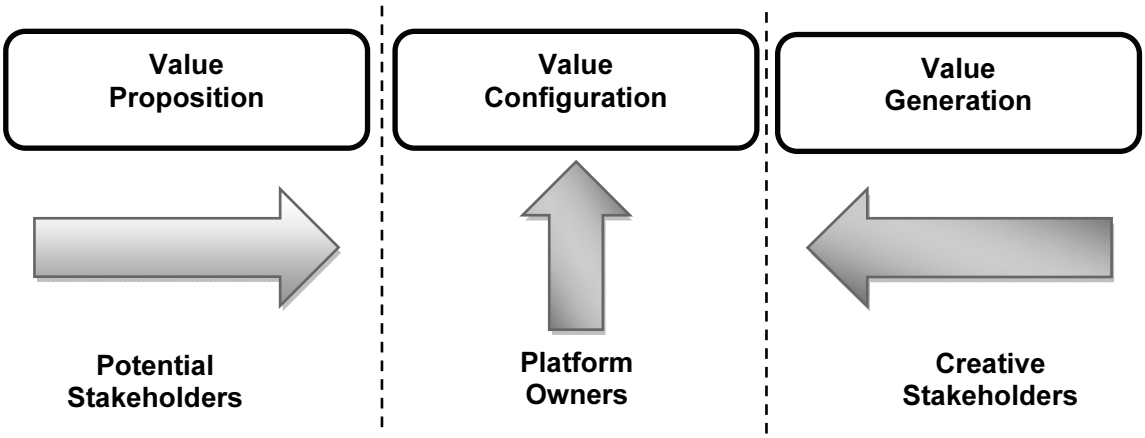

Figure 4. Value framework analysis proposed model

99design vs. Threadless

99designs and Threadless were chosen by authors to highlight if/ that creative companies are also able to adapt to the requirements of a creative ecosystem by innovating their business model through crowdsourcing. Both companies are part of creative industries, the (graphic) design sector, and have embraced open innovation right from their establishment in order to support designers to promote and sell their art.

99designs is considered to be the world's largest online graphic design market, having as main objective the connection of talented freelance designers with creative people, successful entrepreneurs, competent businesses, or anyone who needs a work done in a highly professional way. The connection between the two main parties it is done online through a user-friendly platform, and the essential idea behind it, as Galateanu and Avasilcai (2017) highlighted, is that clients get to choose from a various number of projects, according to their own needs. It is simply about clients proposing a brief idea which then is developed into particular graphical products.

Threadless is active on the market since 2000 when it was set up to give all unknown artists the necessary support to become completely known, according to the platform (99designs, 2018). What started out as a t-shirt company, with more than 400 million sold since its opening, has evolved into home and accessory articles, Artist Shop being the newest edition of the company, an online place where anyone interested get the opportunity to create individual online stores. As Bujor and Avasilcai (2018) presented, the Artist Shop found on the platform supports the artists community in all possible ways, from the unknown stage to the moment the artists finally manages to come out from the shadow cone, even until one decides to open its own company.

Creative ecosystem comparative analysis from stakeholders' point of view

In order to understand the creative ecosystem at this stage, the proposed framework for stakeholder's identification will be applied. According to Hurley (2009), 99designs creative ecosystem comprises: ecosystem suppliers, graphic customers, designers and freelancers, as it is shown in figure 5a. Each participant to the ecosystem precisely defines his/ her requirements excepting graphic designers and freelancers whose main role is to provide their creative potential and expertise. The platform itself acts as a graphic marketplace, being an interactive and dynamic environment where logos and other graphic representations are the results (Galateanu (Avram), Avasilcai, 2017). Potential stakeholders participate in contests development by proposing the main criteria for future collaboration. The main requirements for creative stakeholders are related to their expertise in the domain, skills and capabilities (Hurley, 2009). Threadless is using crowdsourcing as complementary resource to ensure the success and selling of their manufactured products. This creative crowdsourcing platform aims to personalize the product by providing contest for creative stakeholders. Essentially, Threadless ecosystem emphasizes the relevance of customers as creative stakeholders: from customers to customers. Within this ecosystem customers are the most relevant participants in co-creation, along with designers, hobbyist and professional graphic designers, figure 5b. However, as result the creative crowdsourcing platform returns and generates attractive and creative content rather than just a creative design.

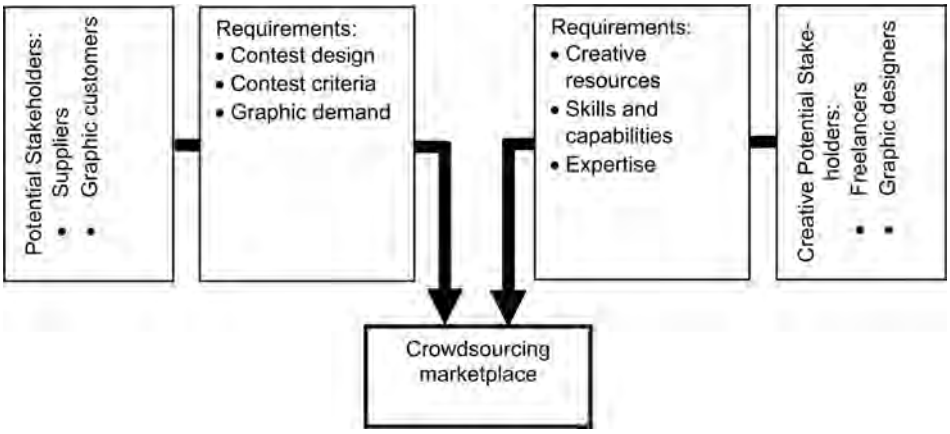

Figure 5a. 99designs creative ecosystem model (Hurley, 2009)

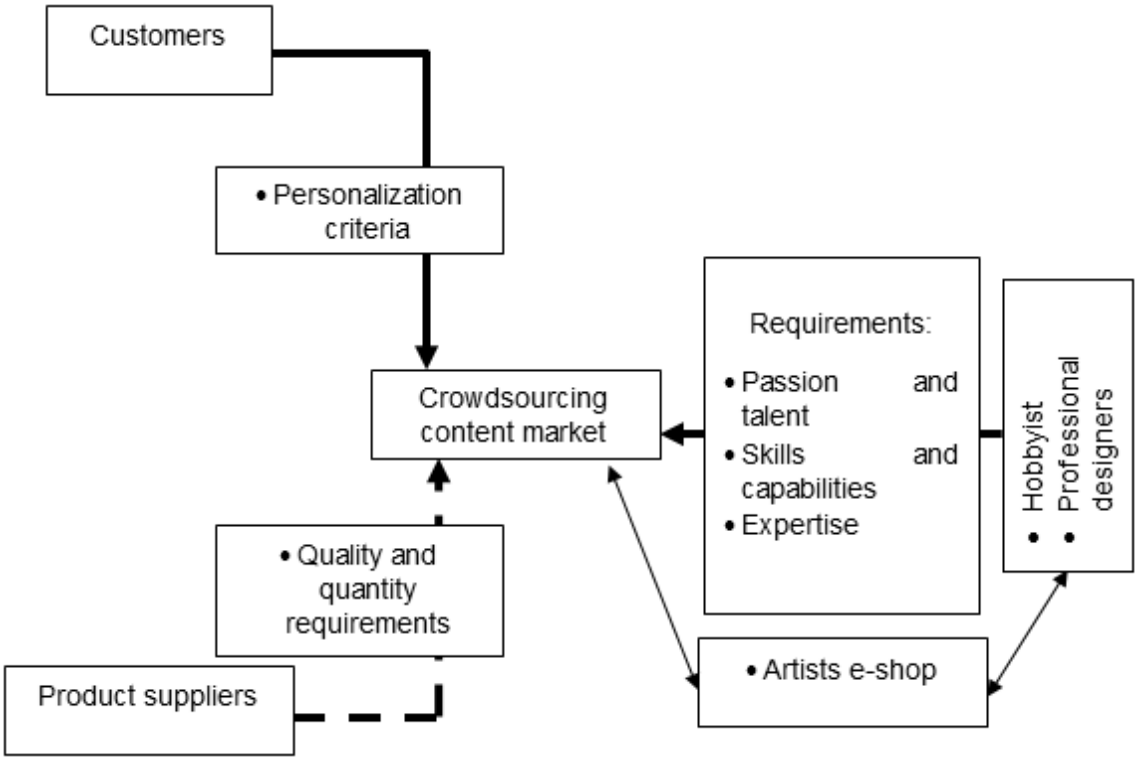

Figure 5b. Threadless creative ecosystem model (Avasilcai and Bujor, 2018)

Creative ecosystem comparative analysis from value point of view

In this part the authors aim to identify, define, and asses value created and distributed by using creative crowdsourcing platforms. In order to emphasize the business model innovation from the value point of view, in terms of the specific requirements and collaboration, the proposed framework in figure 4 will be used. Thus, a comparative analysis will be conducted based on 99designs and Threadless creative ecosystems.

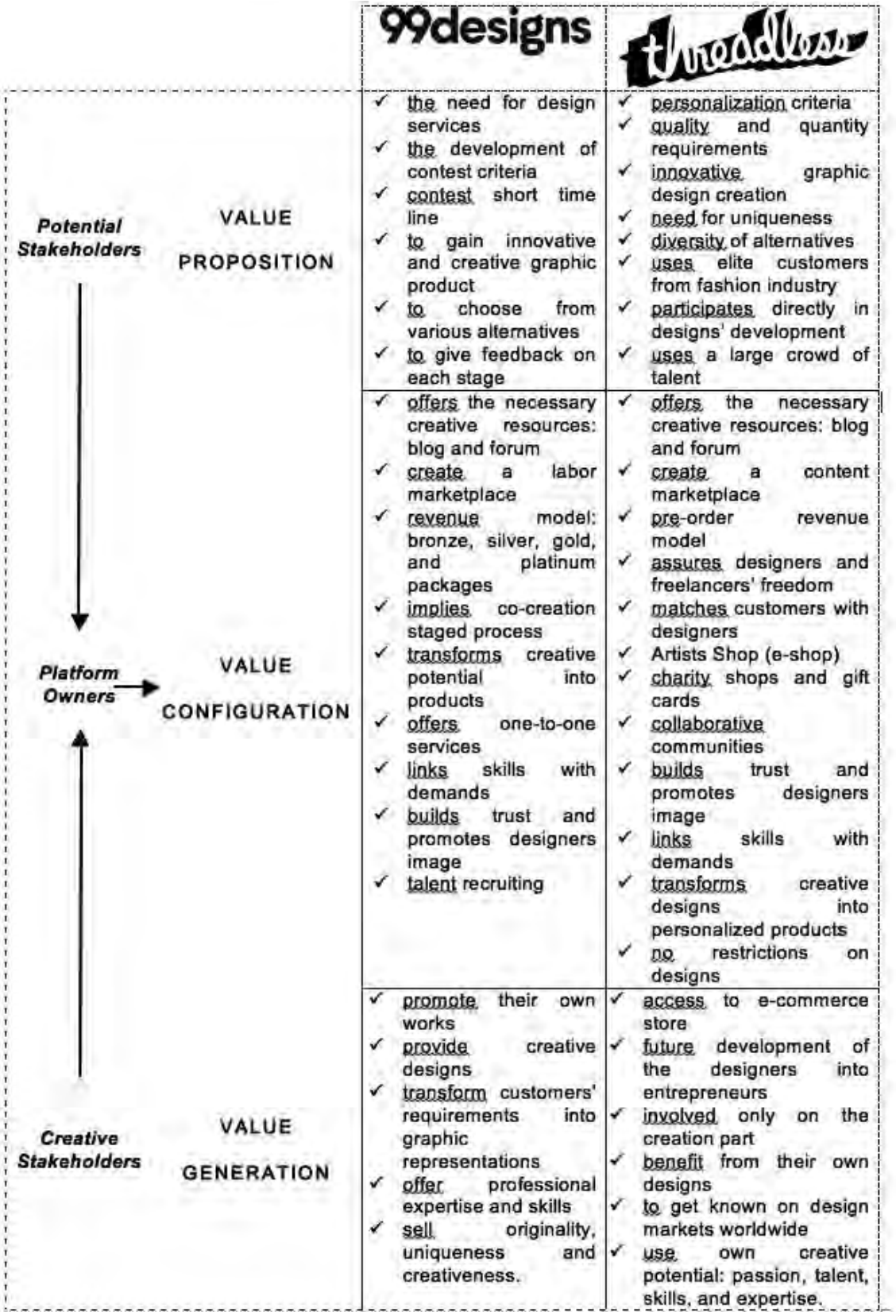

Figure 6. 99designs vs. threadless creative ecosystem proposed model

Discussion and conclusions

The result of the comparative analysis reveals that creative crowdsourcing modules within business model innovation are used differently. There are cases where it tends to be a labor marketplace - 99designs -, or cases where crowdsourcing platform is used for content generation - Threadless. On the one hand, 99designs ecosystem model explains the collaboration between the potential and creative stakeholders limited strictly to graphic design. On the other hand, Threadless ecosystem aims to manufacture their own products which involve actors from their own supply chain. By using personalized platforms, both creative ecosystems are also engaged in co-creation processes and creative talents' promotion, Threadless being considered and seen as a bridge to launching one's own business. From the value point of view, both creative ecosystems models use customers' needs and requirements as main goal in creating a dynamic and interactive environment, exploiting customers as source of potential value. The main difference between them is how they create internal value architecture and revenue models. 99designs uses specially designed reward packages, while Threadless goes for pre-ordered revenue model. Also, the feedback on designs has a major impact on contests development. Creative stakeholders have a major impact on value generation as they are the source of creativity and innovation. Both creative ecosystems use the crowds of designers - hobbyists, freelancers, and professionals - to obtain necessary skills, capabilities and expertise.

Considering all the above, the use of creative potential, a collaborative environment, the exploitation of opportunities brought by clients, new revenue models, crowdsourcing marketplaces represent the main aspects that defines the innovation of the creative ecosystem model.

Acknowledgment

This work was supported by a grant of the Romanian National Authority for Scientific Research and Innovation, CNCS/CCCDI – UEFISCDI, project number PN-III-P2-2.1-PED-2016-0689, within PNCDI III.

References

Al-Debei M., and D. Avison
2010
"Developing a unified framework of the business model concept." European Journal of Information Systems, 19: 359-376.
Avasilcai, S., and Bujor A.
2018
"Open Innovation in Creative Industries. Part II: The Cae of Threadless", IOP Conference Series: Materials Science and Engineering (forthcoming).
Bujor A., and S. Avasilcai
2018
"Open Innovation in Creative Industries. Part I: Innovation and Design", IOP Conference Series: Materials Science and Engineering (forthcoming).
Chesbrough, H., and R.S. Rosenbloom
2002
"The role of the business model in capturing value from innovation: evidence from Xerox Corporation's technology spin-off companies." Industrial and Corporate Change, 11(3): 529-555.
Community Creativity Foundation of Kingston New York
2008
"The creative ecosystem of Ulster County, NY and Environs." An environmental scan, conducted by Seifter Associates of New York City Jaunary – July, 2008: 7.
Galateanu (Avram) E. and S. Avasilcai
2017
"Emerging creative ecosystems: platform development process", Annals of the University of Oradea, Fascicle of Management and Technological Engineering, Volume XXVI (XVI) issue 3: 5 – 10.
Harrington, D.M.
1990
"The Ecology of Human Creativity: A psychological perspective", in Runco, M.A. and R.S. Albert (eds.), Theories of Creativity, Sage Publications London.
Hellstrom M., Tsvetkova A., Gustafsson M., and Wikstrom K.
2015
"Collaboration mechanisms for business models in distributed energy ecosystems" . Journal

of Cleaner Production, 102: 226 - 236.
Howe, J.
2008
“CrowdSourcing. Why the Power of the Crowd is Driving the Future of the Business”, Crown Business, Crown Publishing Group, New York.
Hurley, B.
2009
“Enabling Creative Entrepreneur: Business Ecosystems”, TIM – Technology Innovation Management Review, http://timreview.ca/article/276
Isckia, T., and D. Lescop
2014
“Platform-Based Ecosystems: Leveraging Network-Centric Innovation”, Proceedings of 2nd International Conference on Innovation and Entrepreneurship, 6-7 February 2014: 89 – 95.
Keifer, S.
2010
“Four Types of Crowdsourcing.” https://bantrr.com/2010/05/08/four-types-of-crowdsourcing/
Lambert S.C., and R.A. Davidson
2011
"Application of the business model in studies of enterprise success, innovation and classification: An analysis of empirical research from 1996 to 2010." European Management Journal, 31: 668-681.
Nielsen, C., and M. Lund
2013
"The basics of business models." https://bookboon.com/en/the-basics-of-business-models-ebook
Rasmussen, E.
2007
"Business models and theory of the firm”. Victoria University of Technology, Melbourne, Australia Melbourne: Pharmaceutical Industry Project Working Paper Science.
Rong, K., Patton D., and W. Chen
2018
“Business models dynamics and business ecosystems in the emerging 3D printing industry.” Technological Forecasting and Social Change, in print.
99designs
2018
“About Us.” https://99designs.com/about

STUDIES AND RESEARCH REGARDING THE MARKETING STRATEGY OF AN ONLINE SALES BRAND

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Abstract

Purpose – *The brand's identity and the way in which it guides the company's values influences the brand's image. These are not mutually influenced though, the only actions subsequently determining them are only those that come from the brand's identity, being the only ones that are able to change the way in which the company is being perceived.*

Methodology/approach – *This work comprises a marketing study of the image of a company dealing with the online sale of IT equipment and components, electronic equipment, appliances, personal care products, automotive products, sports items, books, music, movies, house and garden products, pet shop, children products. This marketing research is a quantitative one, the survey is the method used and the questionnaire has been the research tool used. Within this research, the questionnaire has been distributed to a sample of 412 natural persons. Within this research, a non-random sampling method has been used, based on accessibility.*

Keywords: *Marketing research, brand, consumer behavior.*

Introduction

The image of a brand derives from the market orientation and it is represented by the way in which the consumers perceive a certain brand. It refers thus to the vision of the „others" and it differs from the brand's identity.

Comparing it with the brand's identity, which is active, the image of a brand is passive and it is being translated by what a brand has come to mean in the consumer's perception.

Moreover, the brand's image looks thus towards the past precisely because it is based on the brand's action history and on the products it has launched on the market.

The company is the leader of the e-commerce market and holds market shares that sometimes reach 20% of the national sales for certain first class categories and brands.

Accessing the website is possible by entering key words of the product you look for or by visiting the official website. Once the website has been accessed, the customer is able to see a wide range of products, depending on the customer's preferences. All the website's units being optimized after studying the guests' preferences grouped on categories and sub-categories, at hand for the customer.

The analysis of the marketing environment

From this point of view, the company offers a very innovative range of products-services, which are very attractive to the customers and a series of programs, which is the base for the retail network development.

The offer comprises prestigious brands in all the IT area, professional services and the most competitive and current products. The range of products is as varied and diversified as possible, in order to meet the requirements of just as many consumer categories: laptops, system units, monitors, printers,

hardware and software components, specific accessories, covers, phones etc. Therefore, the product policy is based on providing quality products. We can say there is a product policy mix here, which can be explained by the fact that the retail market does not provide only the product, but it also provides an integrated solution.

The most important service the customers benefit from is their registration in the loyalty program, receiving thus their loyalty card. By means of this card, the customers benefit from additional advantages and special offers and vouchers due to the loyalty points. Other services provided to their customers: product replacement, if the customer is not satisfied by the quality of a product purchased, submitting the receipt, it receives immediately a replacing product or the product's equivalent value. The 24-month guarantee for all the electronic products purchased.

The description of the target market

The store has more than 1.000.000 customers, monthly, who buy products included in the current offers. Starting from the marketing concept and the market, it focuses on the consumer needs, the means being the entire marketing activity, while the purpose if that of maximizing the profit and, at the same time, satisfying the consumers. Therefore, the fundamental objective is that of satisfying the customers, by both the sale performed and the services provided by its employees.

The market share helps guiding all the actions so that they can become competitive and efficient. The sales volume of a product or of a trader will show the way in which the sales evolve for the product or the store concerned, which of them is more profitable, how the products are appreciated by the customers, the potential improvements reported.

As for the analysis of the marketing expenses and the sales expenses ratio, measuring the effect an advertising company produces on the seller is a difficult operation. Besides the advertising, the merchant market or the challenges are influenced by several other factors, such as: the features, price and availability of a product and the way in which the product is perceived by the customer. Information advertising allows consumers to find out more about the product's advantages. If the commercial is inappropriately oriented, its message will be understood in wrong or unconvincing way. They will not be attracted at all by the product concerned. If the consumer is satisfied by the purchased product, he/she will repeat the purchase. Likewise, a comprehensive, systematic and periodical examination is also necessary, regarding the marketing environment, the objectives and the strategies. As for the sales force, the company possesses its own online or telephone staff, who answers all the customers' questions, helping them to choose the proper product they want. The company provides monthly courses for training its staff, informing the employees about all the news.

The Methodology

This marketing research is a quantitative one, the survey being the method used and the questionnaire has been the research tool used. Within this research, the questionnaire has been distributed on a sample of 412 natural persons. Within this research, a non-random sampling method has been used, based on accessibility.

The Results

Investigating the 412 natural persons, we were able to notice that all the subjects have purchased online products through the internet.

What kind of products did you purchase?

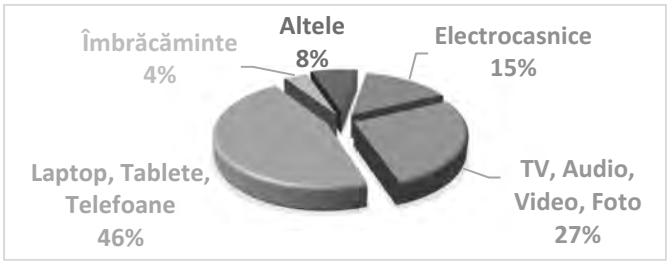

Fig. 1. The products purchased by the subjects

4% - Clothing; 8% - Other; 15% - Appliances; 27% - TV, Audio, Photo; 46% - Laptops, Tablets, Phones

The goods offer is a market category highly related to the demand for goods. The current study aims at analyzing the importance of a wide range of diversified products, intended for customer satisfaction. Thus, (46%) of the study respondents prefer to buy online software and hardware accessories, (27%) TV, audio and video products. The next items purchased are appliances (15%), other products (8%), and a small part prefers the clothes (4%).

Besides the quality services, the relationship with the customers is the most important when it comes to their satisfaction degree. The client-orientation concept has become more and more popular, so that nowadays, a business cannot survive without a good business strategy.

As for the service efficiency and the way in which consumer product purchase unfolds, the result is a favorable one. Namely, the subjects have been 100% satisfied.

How important do you think the following aspects are before buying a product from an online store?

The current study aims at analyzing the safety degree the buyer needs for establishing the seller – buyer relationship. Considering this scenario, it is necessary to research the importance given by the subjects to each feature and the establishment of a feature ranking, based on the noted options of the researched persons.

Tab. 1. Purchase / Important aspects

	Very important	Important	Moderate importance	Less important	Not at all important	Average
Trusting the brand	226	106	47	31	2	4,27
Company history	174	125	112	1	0	4,15
Company reputation	258	154	0	0	0	4,63
Commercial on: TV, Radio, Internet	198	76	62	58	18	3,92

The following values have been given (5 – Very important, 4 Important, 3 – Moderate importance, 2 - Less important, 1 – Not at all important) and the following ranking has been thus obtained, regarding the following aspects, depending on the importance of each aspect before purchasing a product by the consumer:

1. Brand reputation; 2. Trusting the brand; 3. Company history; 4. Commercial.

Globally, the most important factors taken into consideration by the customers buying online are: the money saved, easier shopping, a better product selection or the lack of time.

51% of the subjects buy products online due to the more beneficial prices, 26% believe that one of the most obvious advantages of buying online is the consumer's comfort of buying the product in front of its computer, avoiding the crowded stores or waiting in line. Time is a very common problem nowadays and that is why 23% of the investigated people buy products online.

In the end, some coordinates related to the profit of the studied sample will be also presented.

As for the gender of the investigated subjects, 52 % of them are men, while the other 48 % are women.

The statistical information regarding the investigated subjects' background shows that most of them are coming from an urban location, amounting 86%, while the rest of them, namely 14%, come from the rural environment.

According to the results, we are able to see that the most of the persons surveyed are salaried employees, namely 66% of the total number.

The conclusions of the research

This conducted marketing study provides the image of a successful retailer, who has managed, by means of a very good marketing study, to consolidate its leader position on the Romanian market.

It has managed to consolidate its leading position on the Romanian market because of its increased quality commercial features as compared to other companies doing the same business. A favorable evolution of the image is ensured by means of the commercial, but just as this study proves, the commercial is less important to the buyer.

The strategy based on a balanced price, approached by the online store studied, shows a minimum vulnerability level, in the mid and long term, the effect of the lowest price strategy leading to self-destruction. This happens because of the small profit margins, which are not able to support the investments and the development of information and logistic infrastructure, which are absolutely necessary for the satisfaction of the customer's demand, once they have been attracted.

The wide range of products offered in order to pursue and reach the company's growth and profitability goals are very frequently bought, depending on the category of customers. The growth objective cannot be reached without the progressive expansion of the sales.

Therefore, the analyzed company is a responsible one, preoccupied with constantly analyzing customer satisfaction, as it results from the study we have conducted.

The consumers have their own opinions about the value of the market offers and take their decisions depending on these opinions. Consumer satisfaction depends on the utilization results as compared to its expectations.

The results of this study show how successful attracting consumers can be, managing to identify the need of the client and, at the same time, trying to fulfill his/her wish in a more efficient manner as compared to the competition.

References

Avasilcăi, S., Bacali, L., Trif, C.M.
2009
Antreprenoriat. Cercetări aplicative, Editura Todesco, Cluj-Napoca
Băbuţ, R., Băcilă, M., Drule, A., Moisescu, O.
2014
Bazele marketingului, Cluj-Napoca: Editura Risoprint, 2014

Cordoş, R.C.
2010
Codul etic antreprenorial în industria vânzărilor directe, Revista de Management şi Inginerie Economică volum 9, nr. 1(35), ISSN 1583-624X, Cluj-Napoca
Grosseck, G.
2006
Marketing și comunicare pe internet, Editura Lumen, Iași
Fischer-Buttinger, C., Vallaster, C.
2011
Noul branding – cum să construieşti capitalul unei mărci, Editura Polirom, Iaşi
Kotler, Ph., Armstrong, G.
2014
Principles of Marketing, 15th Edition, Pearson, 2014
Keegan, W. J., Green, M. C.
2015
Global Marketing, 8th Edition, Pearson
Laposi, E.O., Dan, I.S., Oțel, C.C.
2016
Managementul schimbării - dominantă a managementului organizațiilor, Revista de Management şi Inginerie Economică, Vol. 15, Nr. 2, ISSN 1583-624X, Editura Todesco, Cluj-Napoca
Neagu, O.
2012
E-Marketing, Editura Risoprint ,Cluj-Napoca
Prihoancă, D.
2012
„Importance of database for direct marketing campaigns", Studies and Scientific Researches, Economic Edition, nr.16-17, ISSN: 2066 – 561X
Pringle, H. and Marchall, J.
2009
Spending Advertising Money in the Digital Age. Philadelphia: Kogan Page Publishers

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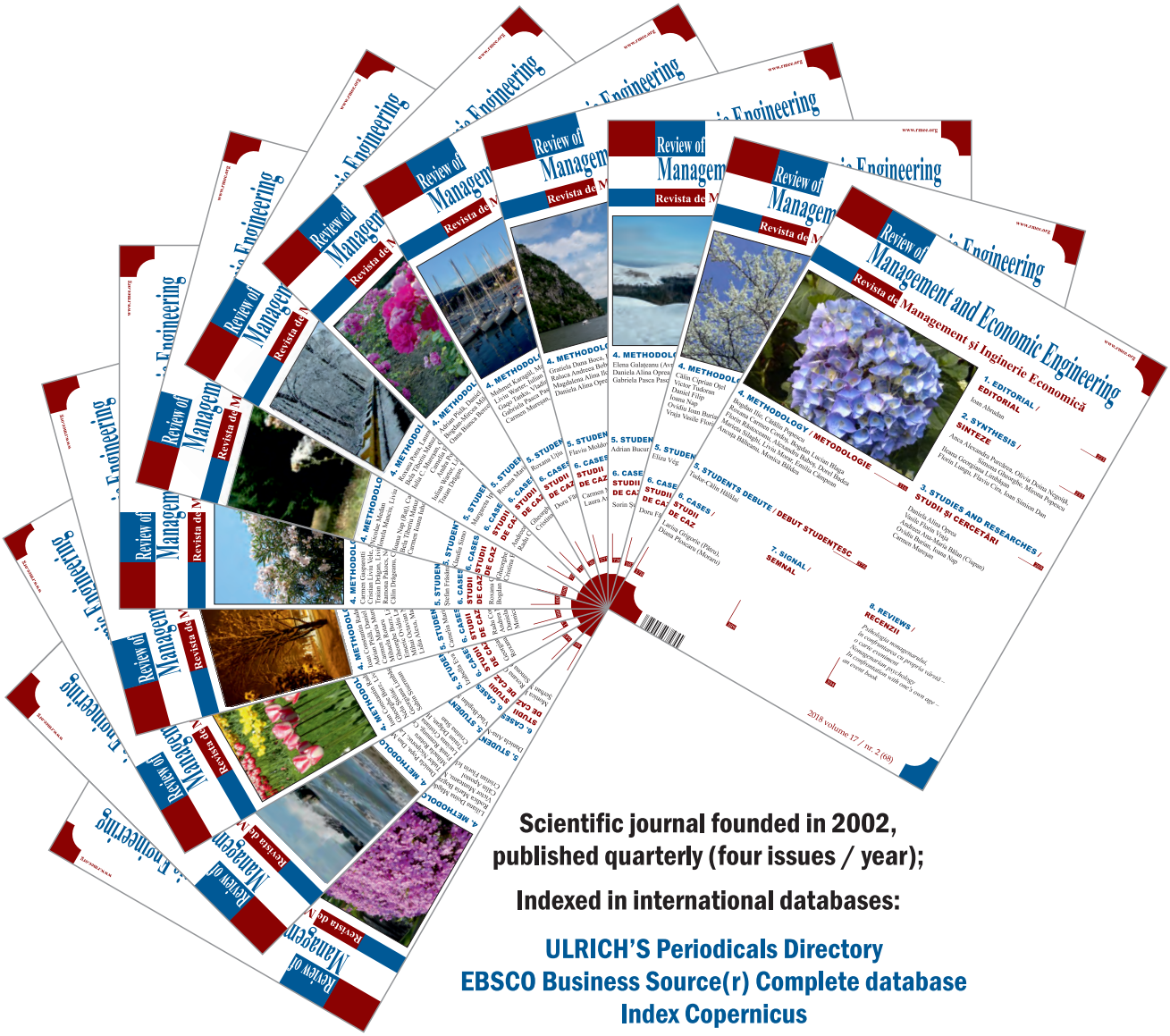

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Review of Management and Economic Engineering

7th International Management Conference

September 2020
Technical University of Cluj-Napoca
Romania

web: www.conference.rmee.org
e-mail: conference@rmee.org

Todesco Publishing House
ISSN 2247 – 8639
ISSN-L 2247 – 8639

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