

**Florin Lungu
- Coordinator -**

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A.M.I.E.R. (Romanian Managers and Economic Engineers Association)

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Section 1

OPPORTUNITIES OF INDUSTRY 4.0 IN TEXTILE INDUSTRY

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Abstract

Purpose – *The research aims to find solutions to implement the concept of circular economy in the textile industry, which is responsible for large amounts of waste, greenhouse gas emissions and land-fill.*

Methodology/approach – *A large number of documents regarding the environmental impact were studied and official decisions issued at European level were considered in order to identify the existing guidelines for reducing waste in textile industry.*

Findings - *The tasks for the textile industry address to new technologies and new materials. The changes are possible by implementing the components of Industry 4.0, including digitization and automation at all stages of the process, beginning with the design of the patterns and ending with packing of final pieces of cloth. Once the needs of this industry are identified, one must find the opportunities among Industry 4.0 components.*

Research limitations/implications – *The results of this research should be detailed for the various activities involved in textile industry.*

Practical implications – *Both companies and education institutions may use the ideas proposed.*

Originality/value – *The present text is a start point for practical implementation.*

Key words: *textile industry, circular economy, Industry 4.0.*

Introduction

It is common knowledge that in the present, the mankind produces huge amounts of waste. The European Union alone is responsible for more than 2.5 billion tones. We all agree that the actual technologies and habits of consumers should change. However, this is not at all a simple task. The technologies working today provide useful products, but drain the natural resources, consume large amounts of energy and water and generate more or less waste harmful from ecological point of view.

Conceptually, the world functions on the linear model of economy (Fig. 1), which is based on a take-make-consume-throw away pattern. This model relies on large quantities of cheap, easily accessible materials and energy. (“Economia circulară: definiție, importanță și beneficii | Actualitate | Parlamentul European”)

The circular economy is a model of production and consumption, which involves sharing, leasing, reusing, repairing, refurbishing and recycling existing materials and products as long as possible (Fig. 2). In this way, the life cycle of products is extended. In practice, it implies reducing waste to a minimum. (“Economia circulară: definiție, importanță și beneficii | Actualitate | Parlamentul European”)

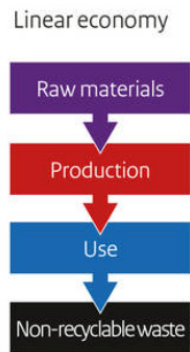


Fig. 1. Linear pattern of economy (“From a Linear to a Circular Economy | Circular Economy | Government.NL”)



Fig. 2. Circular pattern of economy (“Economia circulară: definiție, importanță și beneficii | Actualitate | Parlamentul European”)

In March 2020, the European Commission presented, under the European Green Deal the new circular economy action plan that includes proposals on more sustainable product design, reducing waste and empowering consumers (such as a right to repair). In February 2021, the European Parliament adopted a resolution on the new circular economy action plan demanding additional measures to achieve a carbon-neutral, environmentally sustainable, toxic-free and fully circular economy by 2050.

The most amounts of waste result from sectors such as electronics, plastics, textiles and construction.

Industry 4.0 in Europe, known as Smart Manufacturing in America, Made in China 2025 in China and Innovation 25 in Japan, represents the current trend of automation technologies in the manufacturing industry, and it mainly includes enabling technologies such as the cyber-physical systems (CPS), Internet of Things (IoT) and cloud computing. (Hermann, Pentek, and Otto, 2016; Jasperneite, 2012; Kagermann, Wahlster, and Helbig, 2013)

Industry 4.0 is regarded as the fourth industrial revolution (Fig. 3). (Wright, 2018) It follows the First Industrial Revolution (1760 – 1840) - mechanization through water and steam power, the Second Industrial Revolution (1870 to 1914) - electricity replaced water and steam, started the deployment of assembly lines, interchangeable parts and, mass production and the Third Industrial Revolution (1960 to 20??) – deployment of Robots, CNCs, Computers and Automation.

As an extension of Industry 4.0, Industry 5.0 was defined in order to add a human or social dimension to the technological one. Industry 5.0 places the wellbeing of the worker at the center of the production process and uses new technologies to provide prosperity beyond jobs and growth while respecting the production limits of the planet. It complements the existing "Industry 4.0" approach by specifically putting research and innovation at the service of the transition to a sustainable, human-centric and resilient European industry. (“Industry 5.0 | European Commission”)

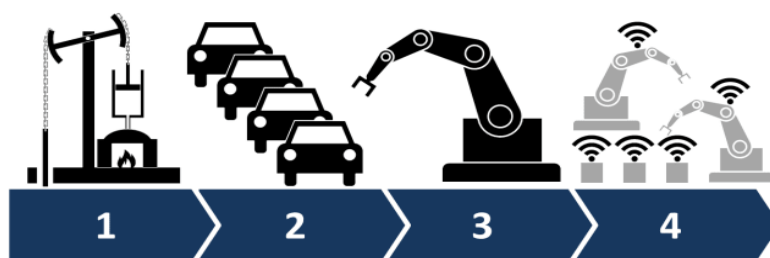


Fig. 3. Symbolic representation of the four industrial revolutions (Hermann, Pentek, and Otto, 2016)

The main components of Industry 4.0 are briefly described below:

- Large-scale digitization, which is the base of any other component
- Cyber-physical systems (Fig. 4), which are characterized by a physical asset, such as a machine, and its digital twin (basically a software model that mimics the behavior of the physical asset). (Bagheri, 2015)

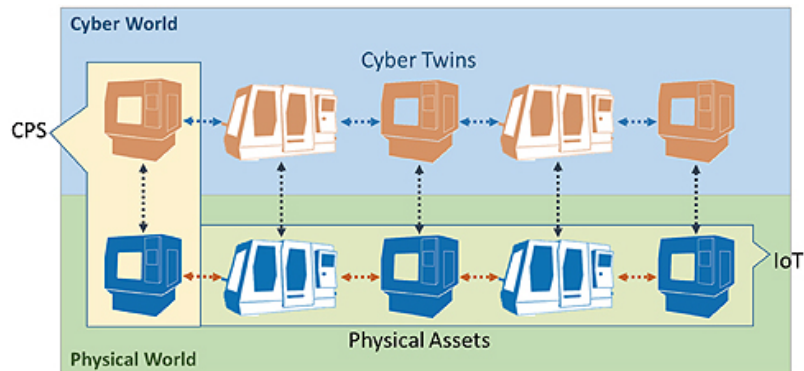


Fig. 4. Model of CPS (Bagheri, 2015)

- The Internet of Things (IoT), which is a system of interrelated computing devices, mechanical and digital machines provided with unique identifiers (UIDs) and the ability to transfer data over a network without requiring human-to-human or human-to-computer interaction (Fig. 5). (Crimm, 2019)

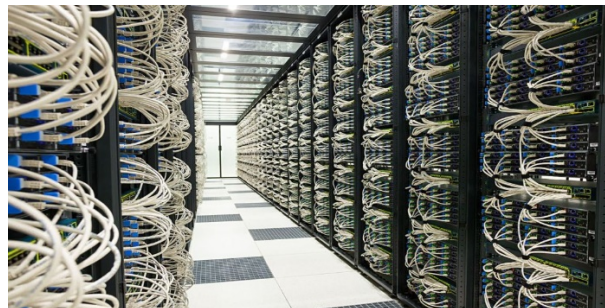


Fig. 5. Multiple connections suggesting IoT (Crimm, 2019)

- Cloud computing which assumes that most of the user will have the applications and databases on the cloud. Individual desktops and laptops will need smaller power and will work at higher speed (Fig. 6). (Wright, 2018)
- Additive Manufacturing, which has a huge potential to replace the traditional machining technologies. With proper materials and software, freeform pieces with precise dimensions and adequate surface texture can be grown in short manufacturing time. A large range of processes are already in use (power bed fusion, direct energy deposition, binder jetting, material extrusion etc.) and manufacture pieces made of la large variety of materials (metals, thermoplastics, biomedical, ceramics). (“What Is Additive Manufacturing | GE Additive”)

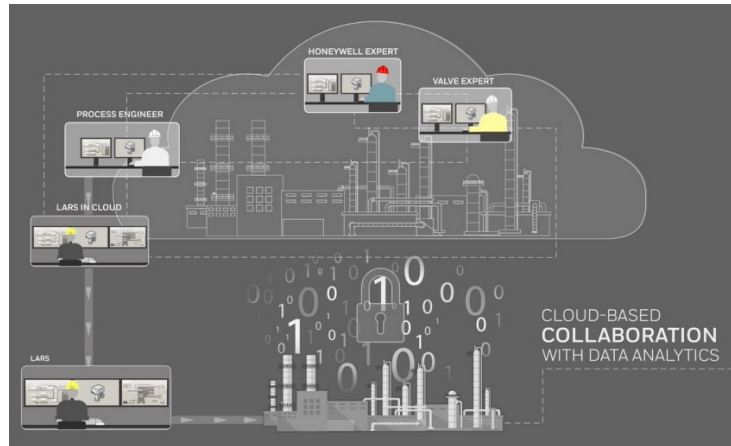


Fig. 6. Diagram of cloud computing system (Wright, 2018)

Environmental impact of textile industry

During the last decades, the textile industry responded to consumer's requirements, namely new styles and low prices. This trend resulted in a very large volume of cloths and household textiles.

The manufacturing of fibers, different fabrics and clothing pollute water, spread greenhouse gas and cause landfill.

Documents issued at the European level provide the following data regarding the actual textile industry ("The Impact of Textile Production and Waste on the Environment (Infographic) | News | European Parliament"):

- 80 billion cubic meters of water are used yearly by the textile and clothing industry (from approx. 270 billion cubic meters consumed by the whole economy)
- 0.5 million tons of microfibers are spilled into the ocean yearly (resulted from washing of synthetic materials)
- 20% of the ocean pollution is due to dyes from textiles
- 10% of global greenhouse gas emissions comes from textile industry (~654 kg of CO₂ emission per person in 2017 in Europe)
- Europeans use nearly 26 kilos of textiles and discard about 11 kilos of them every year. Used clothes are mostly (87%) incinerated or landfilled.

An important element in pollution is the dye, beginning with its synthesis and ending with its presence in clothing or household textiles. Numerous studies are dedicated to identifying the effects of dyes and then to the possibilities to find ecofriendly ways of coloring. (Khattab, Abdelrahman, Rehan, 2020; Elshahida, Fauzi, Sailah, Siregar, 2020)

The short statistics above show the need to re-think the whole process of providing textile pieces, in all stages, from the design to packaging.

The changes are possible by means of implementing tool offered by the new concept of Industry 4.0.

Elements of Industry 4.0 suited to be implemented in textile industry

Considering the goal of minimizing waste, pollution and energy or water consumption, the textile industry may follow two directions:

- To continue to use the existing fabric, in terms of fiber nature, shape and dimensions of semi-finished rolls, tailoring and sewing
- To use new materials, which allow the implementation of new technologies.

Figure 7 synthesizes some ideas regarding the possibilities to make textile industry sustainable, in case it continues to use traditional fabric.

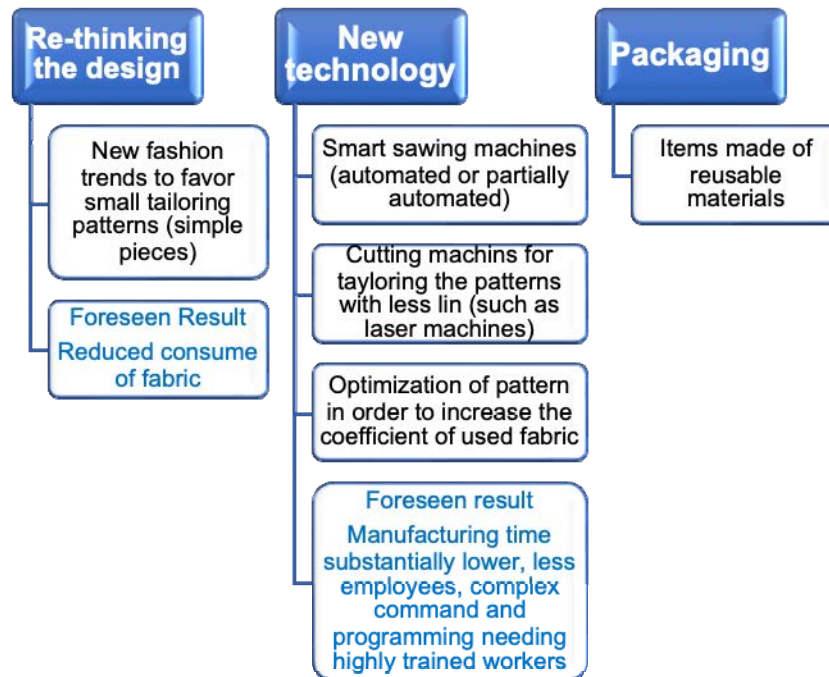


Fig. 7. Possible changes in textile industry keeping traditional fabric in use

The opportunities for changes are found among Industry 4.0 components. In cloths manufacturing, for instance, all stages in the process may be altered and improved:

Advanced software and proper algorithms can be developed to generate digital patterns and provide an optimized arrangement of pattens over the surface of fabric so that the waist of fabric to be minimized.

- Cutting of parts should find a solution to reduce the amount of lint which is generated and spread into the atmosphere.
- Manual labor may be replaced by automated or partially automated sewing of parts.
- All working spaces may be controlled regarding the lint amount through intelligent solutions.
- Packages may be designed using ecofriendly or reusable materials.
- The fashion designers may contribute creating fashion trends based on minimalist pieces.

The implementation of the ideas above requires big investments, as for any other smart factory or even more because, at present, the automation in this industry is lower than in technical products manufacturing.

Considering the present fast progress in materials, it is reasonable to think the textile industry will also benefit of this progress. In this case the technology of 3D printing will successfully be applied in this industry too (Fig. 8).

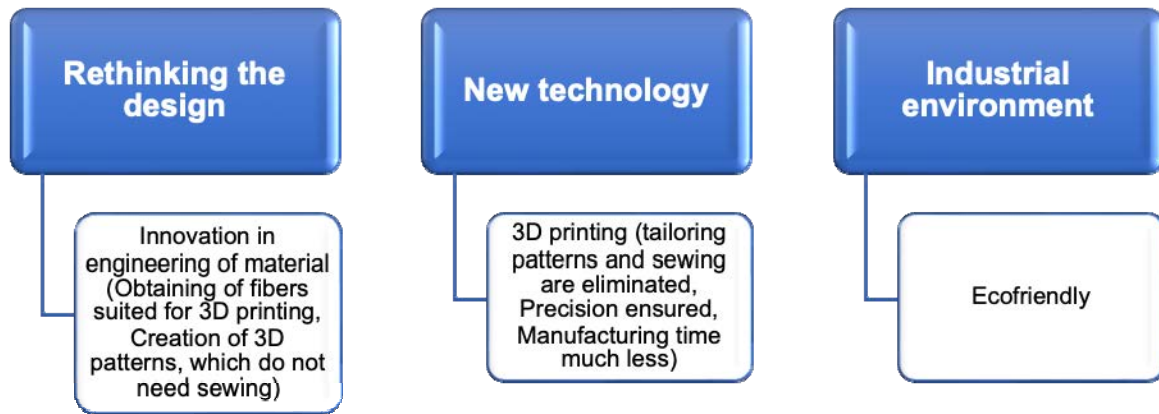


Fig. 8. Possible changes in textile industry with new materials

Printable materials for manufacturing cloths would bring plenty of benefits, such as:

- Single 3D pattern for a piece of clothing
- Stages of tailoring and sewing eliminated
- High degree of reproducibility
- Shorter machining time
- No manual labor
- Digital command
- Minimum waste

3D printed cloths already appeared, but not yet on industrial scale (“3D Printed Clothes in 2021: What Are the Best Projects?”).

The close future will also bring smart textiles, which can change color, shape or thermal properties as automatic reaction to external stimuli. (Orzan, Zara, Florescu, Orzan, 2020)

Conclusions

The textile industry as one of the most important polluters must find ways to reduce waste, gas emissions and landfill.

However, the changes must take into account several specific features of this industry. Its actual functioning uses very few automated equipment, because the number of identical products is small, the models depending on the season and fashion trend. The producers do not invest in automation for small volume production. They prefer to use cheap manual labor, usually developed in the third world countries. The productivity is very low, but the final small price of the products is convenient both for the producers and the customers.

Technological innovation is the solution to increase productivity, reduce waste and develop green production. The components of Industry 4.0 provide opportunities to be implemented in all stages of manufacturing textile pieces.

Still, the problem as a whole must be addressed from technological, economical and social point of view.

The developed countries in Europe and Northern America, within the present geopolitical and economical context, started to re-evaluate the basic problems, which generated the concepts of

circular industry and Industry 4.0. Natural resources and primary energy became so important, that they will probably guide the research directions in the near future. The solutions will have to be implemented in all economical fields, including textile production.

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SIMULATION OF THE EVOLUTION OF ECONOMIC-FINANCIAL INDICATORS IN A ROMANIAN ORGANIZATION

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Abstract

Purpose – *The purpose of this paper is to make a financial diagnosis based on accounting data from 2016-2021, in a Romanian organization.*

Methodology/approach - *The financial risk diagnosis aims at measuring the variability of the company's result when changing the company's activity, changing the structure of and the variability of the company's solvency, its capacity to honor the obligations assumed towards third parties.*

Findings –*The company presents a relatively stable situation, which makes it attractive to shareholders and investors in the conditions of paying due attention to the identified risks.*

Research limitations/implications – *Risk analysis and financial profitability analysis are the two basic components of a company's financial diagnosis. A lending company must systematically bear the related financial expenses (interest), which means an increase in its commitments and implicitly the risk.*

Practical implications –*The analysis indicates that the Romanian society in which the study was started is being balanced, its position on the market being strongly influenced by the macro-economic and political situation in Romania regarding agriculture.*

Originality/value – *The choice of the research topic in the field of risk management was justified on the one hand by the novelty of this field, by the increasing theoretical and applied concerns of the profile organizations, and on the other hand by the need to elaborate complex strategies. at the level of the organization, to ensure its protection against the influences of various factors.*

Key words: *financial diagnosis, organization, economic indicators.*

Introduction

In the implementation of a risk management system at the level of an organization there are three possible levels: basic, medium, and advanced (Albu, 2018). The differentiation is made according to the risk attitude of the company's management, the risky field of activity in which it operates, the need for protection expressed by the company's stakeholders, and the company's experience in ensuring the operation of such a system. 2018; Babii, 2020).

While the basic level only proceeds to the occasional identification of risks and their qualitative assessment, the advanced level involves the use of complex mathematical models assisted by

specialized software packages for periodic risk analysis, as well as the creation of a specialized structure within the organization chart (Oliver, 2020).

In this paper, the focus is on making a financial diagnosis based on accounting data obtained from a Romanian organization during the years 2016-2021. In this context, several critical success factors must be considered that influence the effectiveness of risk management (Ranjbar and Amanollahi, 2018). Respectively, it is recommended that it: be an ongoing process integrated into the organization's strategy; consider all risks affecting the activities of the organization; be integrated into the culture of the organization; to translate the strategy into tactical and operational objectives, designating the responsibilities of each manager and employee involved in risk management, as part of the job description.

Regarding the long-term effects of risk management, the author's view is that after implementation, it should be constantly updated due to rapid progress in specific concepts and working tools. These elements argue the need for regular evaluation of the performance and efficiency of the risk management process.

Financial diagnosis of the last 6 years of activity

Analysis of the structure of the balance sheet assets and liabilities

In the literature, issues related to balance sheet assets and liabilities have been addressed by Akyüz (2021) and Lilia (2021).

Regarding the studied organization, in the first two years analyzed (2018 and 2019) the organization recorded a significant share of current assets in total assets, especially stocks of raw materials, finished production and goods (34% and 42%). Given the object of activity of the company and the low evolution of the profile market, this situation can be considered normal. For the next three years, the share of raw material stocks, finished production and goods decreases to 24%, reaching 15%, due to the acquisition of property, plant, and equipment.

Table 1. Summary of the structure of the balance sheet assets and liabilities

No.	BALANCE SHEET INDICATORS	2016	2017	2018	2019	2020	2021
1	Fixed assets	0.34	0.32	0.54	0.49	0.54	0.54
1.1	Tangible fixed assets	0.34	0.31	0.54	0.48	0.54	0.54
2	Current assets	0.64	0.66	0.45	0.48	0.45	0.46
2.1	Stocks (sqm, production	0.3422	0.415	0.238	0.195	0.15	0.44
2.2	Receivables (commercial,	0.2991	0.246	0.208	0.288	0.300	0.55
2.3	House and bank accounts	0.016	0.019	0.011	0.030	0.014	0.01
	TOTAL ASSETS	1.00	1.00	1.00	1.00	1.00	1.00
3	Equity - CPR	0.27	0.31	0.68	0.67	0.60	0.56
3.1	Paid subscribed capital	0.093	0.084	0.176	0.202	0.200	0.313
3.2	Revaluation reserves	0	0	0.403	0.358	0.295	0.583
3.3	Reserves	0.102	0.142	0.065	0.044	0.060	0.104
4	Long-term debt (> 1 year)	0.0581	0.0244	0.0055	0.0020	0.820	0.076
4.1	Amounts owed to credit institutions	0.0481	0.0223	0.0039	0.0000	0.0000	0.076
5	Current debts (<1 year)	0.58	0.58	0.28	0.30	0.26	0.361
5.1	Amounts owed to credit institutions	0.29	0.39	0.21	0.19	0.15	0.206
5.3	Trade debts	0.12	0.15	0.060	0.094	0.09	0.081
	Permanent capital	0.33	0.34	0.68	0.67	0.68	0.639
	Total debts	0.64	0.60	0.29	0.30	0.34	0.361
	TOTAL LIABILITIES	1.00	1.00	1.00	1.00	1.00	1.00

Total fixed assets are at acceptable levels in the first two years (34% and 32%, respectively), but in the second half of the analyzed period there are significant increases, the level exceeding 50%. It can be considered that this increase in fixed assets means a reduction in the company's flexibility, but most of the assets of tangible assets, in the category of land and construction (67% and 70% respectively) indicate a consolidation of the position in the region. In this way, the company is covered against the risk of losing the space needed to carry out the activity and the inability to expand and develop.

The level of receivables throughout the analyzed period is high, registering only a slight decrease in the third year (21%). The availabilities register an average weight of approximately 1% in the whole period, except for the year 2018, when their volume amounted to 3%. The two assets indicate an unsatisfactory liquidity situation, for the compensation of which short-term financing loans were contracted.

The share of equity is low, reaching a level of about 30% in the first two years of analysis. A potential explanation for this situation can be given by the absence of the revaluation of assets severely affected by inflation, a decision that also involves an undervaluation of Kuprina's equity (2020). Over the next two years, the share of equity jumped to about 68%. This situation can be explained in correlation with the previous observation regarding the revaluation of assets. Thus, the documents provided show that in the period 2018-2020, revaluations of assets were carried out, which also determined the correct assessment of the value of equity.

The level of total liabilities in the balance sheet liabilities is high (60-64%) in the first two years analyzed, the majority share being held by operating liabilities, especially short-term loans (30-40%). The need to take out short-term loans is a direct consequence of the high level of receivables, i.e., the inability to collect the amounts due from the sale of products.

The next period under review is marked by a significant reduction in total debt, reaching 34% (2020), due to the repayment of a significant part of long-term loans. The majority share, in total debts, is also held by operating debts, especially short-term loans (28-30%) necessary to finance the current activity, in the conditions of a high level of receivables (28%).

The analysis indicates that the analyzed company is in the process of balancing, its market position being strongly influenced by the macro-economic and political situation in Romania regarding agriculture, especially following the accession to the European Union.

Analysis of working capital indicators

The total working capital expresses the total need to finance the current operating activity, at the level of current assets (Rahmini et al., 2021). During the analyzed period, there is a significant fluctuating annual increase of the equilibrium indicator.

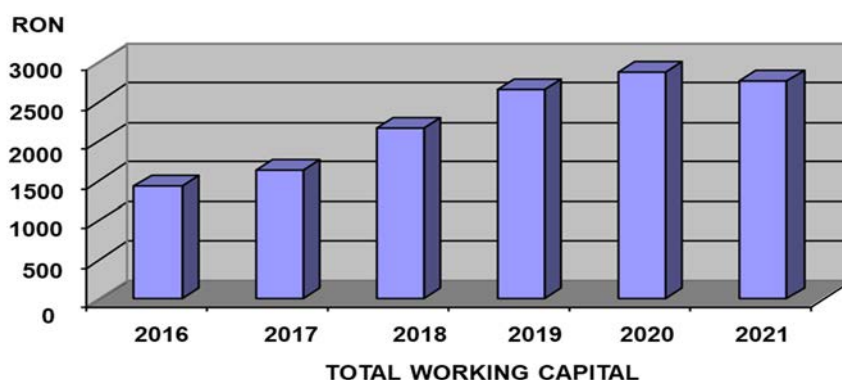


Figure 1. The evolution of the total working capital

An evolution of the total working capital was identified in the organization as a direct consequence of the evolution of current assets. Thus, these, mostly stocks of finished products and trade receivables, have an increasing evolution, throughout the analyzed period, indicating certain difficulties in the process of sale and in the collection of receivables. However, the situation presented is not a cause for concern,

because in case of need, consistent stocks can be obtained by liquidating stocks and recovering receivables.

Liquidity and solvency analysis

In the first two years of analysis, the financing of stocks through the working capital registered low values (0.3%, respectively 8%), but in the rest of the period it had a strong ascending evolution (59% and 95%). In the first case, it is possible for stocks to be financed on account of operating debts, which is not a problem if relations with suppliers of raw materials and consumables are stable.

The second situation indicates a prudent stockpile financing policy, as a direct consequence of the change in development strategy for the next five years.

Current (general) liquidity is below the 2 (recommended) value throughout the analyzed period, but from 2018 to 2019 the indicator shows a significant increase. based on the capitalization of short-term assets, such as by collecting the value of finished products from a manufacturing cycle (possible situation for the company, which covers only 20% of a still developing market).

To quickly identify the liquidity status, the Immediate Liquidity indicator should be around 0.8. In the period 2016-2018, the values of the indicator were reduced (0.4-07), but increasing, reaching in 2020, the value of 0.98. For this reason, it can be considered that the situation of the company is excellent in relation to the recommended level.

In economic terms, this indicator shows the company's ability to meet short-term payments due (current liabilities), only on assets easily convertible into liquidity (receivables and other treasury assets).

However, the mere existence of receivables from customers is not sufficient to cover overdue debts. The phenomenon of claims on some litigious business partners, or bad payers is still a reality of the domestic market, which is why the Liquidity at sight indicator provides more conclusive information on the risks of default.

Thus, for the entire analyzed period, the organization records values between 0.03 and 0.1, well below the recommended level of 0.2. Putting the indicator at these low levels means a high risk in terms of the possibility of covering immediate debts, only through treasury assets (the most liquid assets). The situation can be rectified by better managing customer and supplier relationships, by reducing payment terms for customers and by obtaining more relaxed payment terms from suppliers.

The general solvency ratio is super unitary for the entire analyzed period, in the last three years even registering high values up to 3.8. This rate measures the risk of non-payment of debt, which in the case of the company is non-existent, its total assets being more than sufficient to cover current debts.

Analysis of financial balance

From the point of view of financial autonomy, the company registers values very close to 1, in 2019 it will be 0.997. This situation indicates a declining indebtedness, due to the repayment of long-term loans contracted in previous years and the increase of equity through issues of shares, or revaluations (Sun, 2021). The evolution is normal for a developing company.

In the first two years of analysis, the debt ratio is 0.12 - 0.15 above the recommended value - 0.5, but then the values of the indicator decrease to 0.34 in 2020. The financial significance of the indicator refers to the debt ratio total and total assets of the company, this being optimal the lower. In the case of the company, the debt rate of 2016 and 2017 is a direct result of the contracted operating debts, and in the following years the decrease is due to the reduction of long-term debts and the increase of total assets, the level of short-term debts registering insignificant increases.

The indebtedness of the company decreases from 17.5% in 2016 to 0.3% in 2019 but increases rapidly to 12.09% the following year. The indicator provides information like the Debt Rate, but from the perspective of the company's permanent capital. Compared to the recommended level - maximum 0.5, the values recorded by the company show a low degree of indebtedness, which indicates its ability to contract long-term loans.

Regarding the interest coverage in the period 2016 - 2019, the values are fluctuating, but super unitary thus highlighting the company's ability to pay interest on net profit. In 2017 and 2018, due to negative values, the indicator is not relevant.

In 2020, due to a lower net profit compared to 2019 and an increase in interest expenses, the interest coverage decreases to 0.73. However, it is not a warning sign, as the company is running refurbishment and development programs, financed by bank loans, designed to supplement sales in the next period.

The evolution of earnings per share registers a continuous decrease in the period 2016-2020 with a slight increase in 2019.

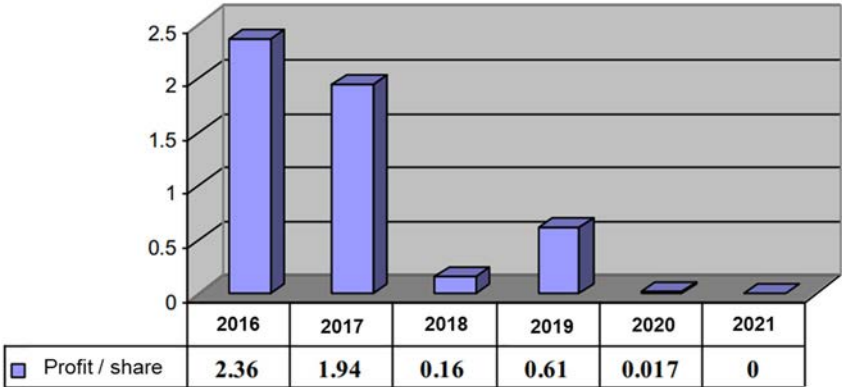


Figure 2. Evolution of earnings per share

Analysis of operating expenses in relation to turnover

The company produces agricultural machinery and equipment, products that require various raw materials and consumables and in large quantities. For this reason, expenditures on raw materials and consumables are high in relation to turnover (36-49%).

Staff costs also account for a significant share of turnover. They have a moderately increasing evolution (25-30%), being largely influenced by socio-economic policies at national level and by the change of the staff structure throughout the analyzed period. It is worth mentioning that, due to the type of production of the company, over 50% of the staff is represented by directly productive workers.

The third category of expenses that has a significant share of turnover are those for works and services performed by third parties (13 - 15.5%). The activity of the company involves maintenance and repair expenses, study and research expenses, management and rent expenses, insurance premium expenses, expenses with collaborators, commissions, fees, protocol, advertising, transport, travel, secondments, postal and telecommunications taxes, banking, etc. (Nariswari & Nugraha, 2020).

Given the size of the entire activity of the company, the level recorded by the expenses for the works and services performed is acceptable.

The other elements of expenses have low shares in the turnover and have a stable evolution, considering the size of the company.

Total operating expenses have an increasing evolution in the period 2016 - 2021, exceeding the level of turnover, except for 2019 when there is a significant decrease, close to the level of 2016.

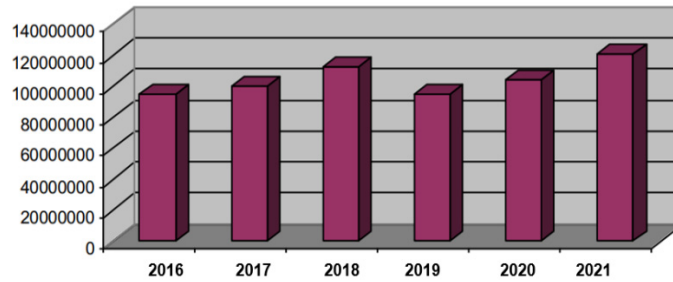


Figure 3. Total operating expenses

Self-financing capacity

This indicator reflects the volume of potential financing resources created by the company in the management of its business, some of which can be allocated to finance future activity (García-Sánchez, 2021). The self-financing capacity of the analyzed company is low in the first and last year of analysis, registering high values in the period 2017-2018. The annual decrease of the financing capacity in the period 2019 - 2020, is largely due to the investment, modernization and development policy adopted by the company in 2018.

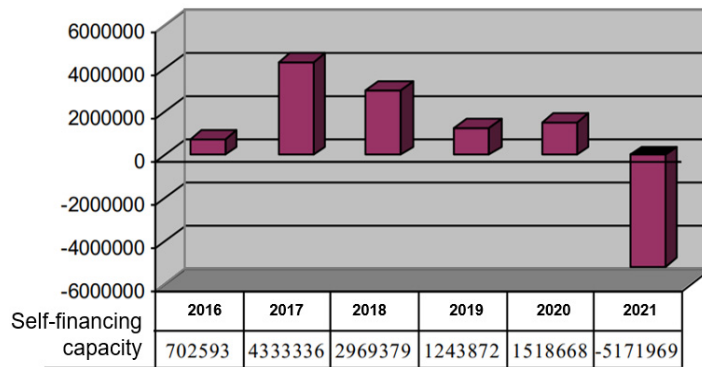


Figure 4. Self-financing capacity

The information of the previous indicator must be analyzed in correlation with the actual self-financing, to describe as accurately as possible, the performance of the company. Thus, figure 5 shows that the company opted for a total profit reinvestment policy in the period 2016 - 2018, and in 2019 and 2020 it distributed on average only 6% of the total profit, keeping the difference in reserves. This decision had the consequences of increasing the self-financing capacity for 2020, the self-financing policy being severely affected in 2021 amid the general economic decline.

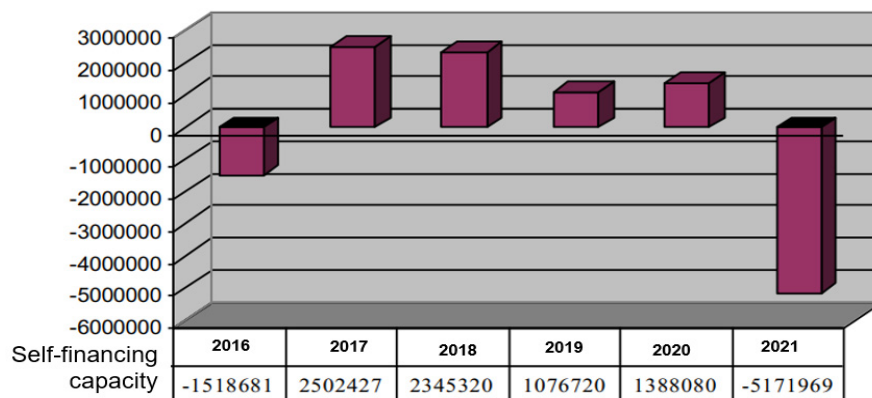


Figure 5. The evolution of self-financing

Analysis of the company's activity

The company's activity is measured by the recovery time of the management element by turnover and by the number of recoveries from turnover. Thus, the following conclusions can be drawn about the analyzed company.

The asset has an increasing duration of rotation reaching 652 days in 2020. As a result of the investment programs carried out in the last two years, the total assets have also increased, thus the company, having in its patrimony lands, constructions, and high value equipment. For this reason, the asset recovery period is considered normal, as is the number of revolutions (0.56).

The above is also confirmed by the rotation of fixed assets, which have an upward trend, with small fluctuations throughout the analyzed period. The number of rotations is between 3 and 5 for 2018-2017 and on average a single rotation, for the next three years. The situation presented is a good signal for the company's activity because it indicates an efficient management of fixed assets, in the sense that they generate a higher level of turnover.

Normally, the rotation of liabilities is the same as that of assets, the explanation in this case being the increase in share capital, a high level of reserves and total debt.

The stocks have quite long rotation times due to the existence of stocks without movement, as well as the intensification of the activity in the last analyzed period. It should be noted that a large share in the total stocks have the finished products and the goods. It is very possible that this situation will be determined by the production cycle specific to the organization's activity, by some contracts with a duration longer than a financial year, which has consequently the production on stock and the anticipation of the growth of the market in the next period.

Receivables are recovered after a very large number of days, which indicates a relaxed customer policy, as well as the existence of bad creditors, or those who are unable to pay. The situation worsens in 2020, reaching 192 days for the recovery of customers.

Cash flow analysis

The operating activity results in a positive cash flow in the period 2017-2020. This situation is favored by a higher net profit in the last three years of analysis, by a positive change in working capital requirements as well as by the increase in depreciation expenses occasioned by investments in fixed assets in the last period.

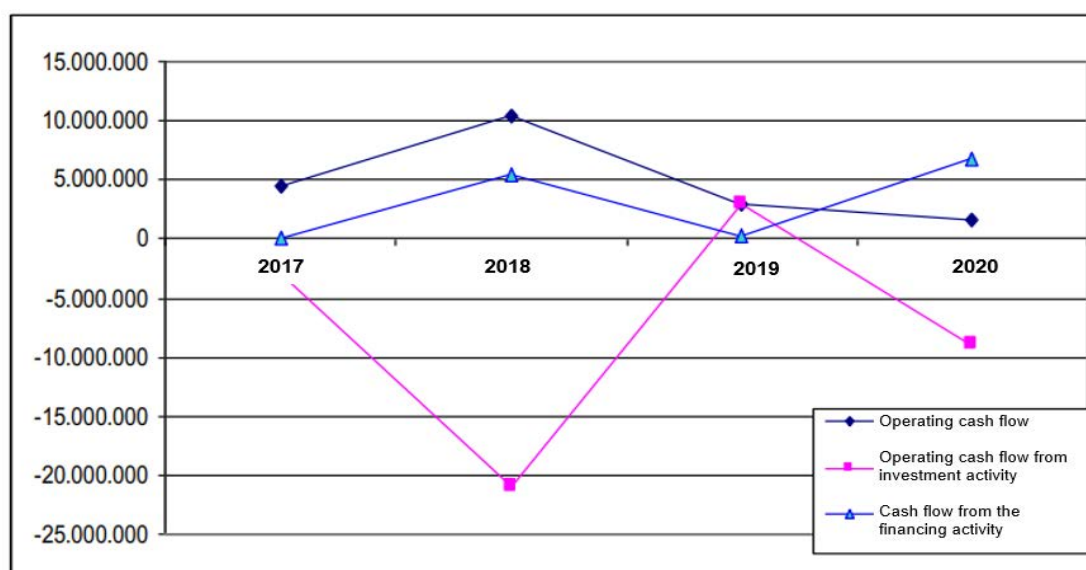


Figure 6. Evolution of cash flows

The cash flow for investments has negative values and has a decline between 2017 and 2018, due to the endowment with new equipment and the acquisition of other tangible assets. In 2019, its value became positive due to the reduction of investments and due to the sale of fixed assets, thus increasing the level of revenues from investment activity.

The financing activity was productive throughout the analyzed period, the values of cash flows in this field being always positive and consistent, especially in the period 2018-2019. This situation means the supply of treasury accounts with funds attracted from shareholders and creditors, respectively capital increases, and the contracting of bank loans (Soboleva et al., 2018).

Analysis of profitability indicators

The financial profitability of the company has an oscillating evolution, starting from 34% in 2016, reaching 6.63% in 2020. In other words, the financial profitability decreased from 3.43 lei net result / 1 lei equity to 0.663 lei net result / 1 leu equity. The decrease in efficiency is mainly due to the increase in equity during the period under review, given the reduction in net operating income, especially in 2017 and 2018.

Economic profitability is low, showing a significant decline in 2016-2020, with a slight return in 2019. The indicator measures the efficiency of economic assets through net operating income. Thus, in 2003, 1.48 lei per 1 lei of economic assets were obtained (maximum of the period), in 2018 (minimum of the period) 0.39 lei / 1 lei of economic assets and 0.51 lei per / 1 lei of economic assets in 2020. The most likely cause for declining profitability is most likely the acquisition of fixed assets and the increase in equity, especially in the last two years of analysis (Abeyrathna & Priyadarshana, 2019).

The values of the company's economic and financial profitability must be compared with the profitability in the sector in which it operates, as well as with those of competitors to create an overview of performance (Haldane & Chowla, 2021).

Regarding the evolution of variable operating expenses, there is an increase in the period 2016-2017, the majority share being held by expenditures on raw materials and consumables. Correlating with the intensification of production activity in 2017, this evolution is perfectly justified. At the same time, fixed expenditures increased slightly, mainly due to investments in fixed assets.

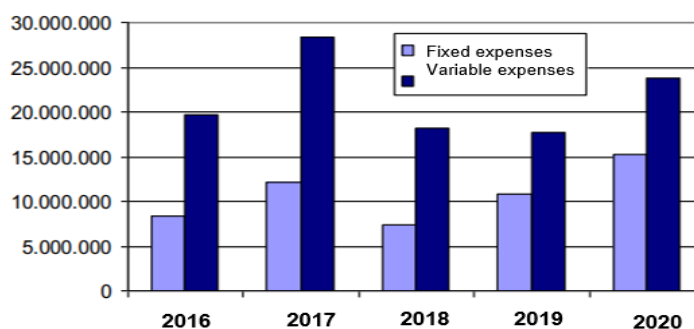


Figure 7. Evolution of variable expenditures and fixed expenditures

In the period 2017-2019, the variable expenses decrease sharply, so that in 2020 they will register a level close to that of 2017. The stabilization of the production program and the rigorous management of the operating costs justify this evolution to the greatest extent. Also, another important factor was the refurbishment of the production sections, which determined the reduction of specific costs such as energy consumption, water, maintenance. The increase of fixed expenses registers a fluctuating evolution, as a direct effect of the increase of depreciation expenses, but in the period 2018 - 2020 they know a continuous increase. Their level greatly influences the critical point of profitability.

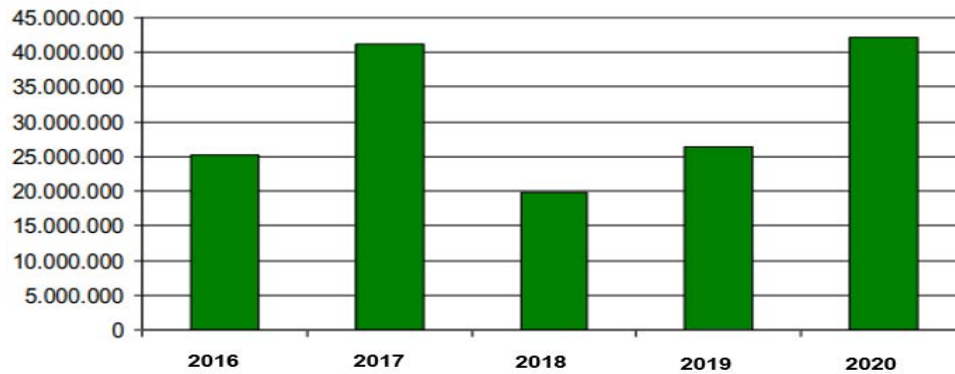


Figure 8. Evolution of turnover at the break-even point

Conclusions

Following this financial diagnosis, the following conclusions are presented below.

The payment policy of the suppliers makes it possible to ensure free financial resources in each month of activity. An important aspect and at the same time a strong point is the changes identified in the structure of fixed assets, in the sense of refurbishment and modernization of production sections.

Investments in fixed assets such as land and buildings offer stability and the possibility of obtaining additional income in exceptional situations, knowing that the real estate market is experiencing an accelerated development.

Increasing equity is another identified strength. Low indebtedness means adequate management of loans and the possibility of receiving advantageous loans in the future.

A long-term financial equilibrium could be identified. The low share of overheads in total expenses indicates the existence of adequate cost management. Overall solvency is satisfactory.

The existence of own patents and trademarks has also been identified. There is a high level of trade receivables as well as long recovery times. Own resources are reduced in volume and are not sufficient to finance the current activity. Liquidity is low and total operating expenses are high compared to turnover.

There is some old, energy-intensive, low-capacity machinery and equipment, and the large industrial park requires additional maintenance costs.

Acceleration of the turnover rate of stocks of finished products has been identified because of the expansion of the internal and external market. It has been identified to reduce the recovery period of trade receivables by improving customer policies. Investing in the company's image, consolidating its own brands in the market, and using the reputation of licensed brands is an opportunity for improvement, along with outsourcing activities to obtain lower total costs and the emergence of alternative energy suppliers on the market.

Aspects that endanger society concern the instability of economic and fiscal policies at the national level and the uncertainty regarding the future evolution of the agricultural sector at the national level.

Lack of financial risk management in general management can have long-term negative consequences, including bankruptcy

The analysis conducted for the period 2016-2021 indicates that the analyzed company is financially stable and has real prospects for development.

On the one hand, the company has many strengths that can be exploited for future business, but on the other hand, it faces difficulties in terms of debt recovery and management of stocks of raw materials, finished products and production in course.

Also, its activity is still dependent on the situation in the agricultural sector and on macroeconomic policies on agriculture, both domestic and foreign (with a view to intensifying exports to Russia).

The forecast activity indicates a steady increase in economic performance, but which can be further improved by reorganizing the business.

In this sense, it is recommended to change the management of receivables and stocks of raw materials, outsource large activities consuming financial resources to specialized companies, sell unnecessary fixed assets (halls, fixed assets, etc.), ensure the activity against the most common categories of risks, the adoption of production methods meant to streamline the activity (Six Sigma, Lean Production, just in time, etc.).

The investment program started in 2018, continued in the period 2019-2020, generated beneficial consequences for the future activity.

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PERFORMANCE INCREASE BASED ON JOB ANALYSIS WITH COMPETENCY APPROACH ASSIGNED TO MANUFACTURING INDUSTRY 4.0+5.0

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Abstract

Purpose – The aim of the research topic is to identify a model for increasing performance through the development of human resource competencies in manufacturing organizations, based on the premise that the main needs of employees are related to the training and development of skills as well as the acquisition of knowledge needed within the organization.

Methodology/approach - Concepts and theories related to Industry 4.0-5.0 are still new and yet developing, based on empirical studies, which do not work always across the board. For this reason, the research methodology is based on recent literature review and primary data collection from articles published in the last 7-8 years. In parallel, we have also drawn on established formal theories of human resource management, in particular performance management and the recent concept of HPWS (human performance work system). Regarding the theories of the socio-technical system, which define the organization of production, the concepts of W.P. Newman were chosen, because from an ontological point of view they point to the actual reality, versus the old concept of Davis and Trist. The proposed model for determining the growth of human resources performance in the organization is based on the hypothesis of existing of the interaction between the organization as a socio-technical system (based on the theories developed by W.P. Newman) with the categories of employees, who are determined to perform, due to motivational factors, personal skills and the work environment, according to the HRM concepts of Snell & Morris. The technical factors that features Industry 4.0 can boost the enterprise in the race for competitive advantage and can be customized as sources of working tools according to the nature of the activities to stimulate internal human resources. A second hypothesis deriving from the first one is following the main directions of the 4.0-5.0 core competencies as a base of performance of the specialist-operator. The essential competences of the job should be combined with the 10 categories outlined by the World Manufacturing Forum, in 2019 to become the needed mix for a specialist I4.0. Their mix can be different depending on the manufacturing profile, the weight of each competence being determined by the measurement tools used for assesment . This study is proposed to illustrate an example related to the clothing industry by using the job analysis in the organization, having an outcome with job design based on competences based approach of Snell & Morris.

Findings – Industry 4.0 -5.0 factors can be a source of learning, in order to obtain the adequate set of competences adapted to the manufacturing industry. Increasing the individual and team performance of employees is based on the development of the 4.0-5.0 competences mix, developing the theory of mass customization at the level of incentive factors which stimulate the contribution of each employee through their particular skills and developed knowledge. Thus, Industry 4.0 factors become the opportunity to grow the organization and win the race for competitive advantage, but a adequate design of job profile must be constructed in order to appreciate and reward specifically the competences which are providing the employees performance.

Research limitations/implications – Today, due to the economic crisis triggered by the health effects of the Covid 19 pandemic, there is a steady decline in interest in manufacturing activities, particularly in the garment industry, due to the long training cycle of manual dexterity skills, in which human-machine interaction is predominantly manual, and on the other hand the limited level of computerized development, with managerial preoccupation focused on obtaining profit with reduced personnel costs, without a defined goal linked to the motivation of employees or the attraction of new generations and without the visibility of a personal development perspective. The effervescence of innovations coming from Industry 4.0, besides the obvious advantages offered by technologies, has however led to a lack of focus on the development of human initiative, leadership training and management adapted to the new

challenges. The definition of Industry 5.0 can be considered as a natural consequence of the unresolved aspects of the Industry 4.0 stage and can be seen as an opportunity to develop the scientific framework to define concepts from the social sciences and humanities with a focus on the human factor.

Practical implications – The major concern is related to the achievement of competences & skills mix for employees, in order to create the level of attractiveness to work in manufacturing production activities. Under these circumstances, the category of human resources that needs attention is related to direct blue collar" human operators with machine interaction. They have to cope with possible job losses through replacement by new means of work Industry 4.0 (cyber-physical system, digital twin, industrial robots) but on the other hand, enterprises are facing acute labor shortages due to outdated human resource management strategies, still lagging behind at the mass production stage of Industry 2.0-3.0. For social & human sciences is unfolding directions of performance research and concepts looking for updated incentive factors to motivate and attract the human resources for manufacturing industry. The proposed model for determining the growth of human resources performance in the organization is based on the premise of existing of the interaction between the organization as a socio-technical system based on the theories developed by W.P. Newman (2020) with the categories of human resources. The employees are determined to perform, due to motivational factors, personal skills and the work environment, aiming to attain the parameters of HPWS (high performance work system) based on human resources management concepts of Snell & Morris (2020).

Originality/value – A research objective regarding management strategies to gather and revise the strengths & weakness of existing practices, in order to turn them into a valuable tool to combat negative effects of volatile/uncertain economic environment.

The work experience of enterprises which succeeded to survive during the pandemic crisis shall be used as best practice examples, to build new direction of human performance researches, available for broad spectrum of industrial activities, not only in the IT industry niche.

Key words: Sociotechnical system Industry 4.0 W.P. Newman, High performance work system Snell & Morris, competences of specialist I.4.0.

Introduction

In view of the new challenges facing the strategic management of organizations that are acutely confronted with staff shortages, competition in the labour market and the attractiveness of activities for their own employees, it was considered relevant to combine the meanings of the human performance in order to take into account efficiency, fairness in the attitude towards people from within, the needed competences to stimulate in the achievement of the purpose of the enterprise, and economic success in caring for competitive advantage and external customers satisfaction. This approach could be confirmed by the matrix model proposed by G.A. Cole (2000) which advance the idea of the link between the level of concern for the customer and the level of concern for the employee, as shown in Figure 1. The human resources management strategies should find the break even point between the quadrants assigned to maximum commitment of to the goal of excellent customer service and satisfaction neglecting the needs of employees and the one of full attention to employees needs. The balance is obtained whenever the chances of achieving a favourable outcome increase, where internal staff is motivated and empowered by the mission. For personnel management, the danger is that it can over-emphasize the needs of employees to the detriment of the customer's cause and miss the ultimate objective of the work and the mission of the organization, which is win-win business operation for the customer and the entrepreneur. Balanced attention to both stakeholder groups increases the chances of success of the whole organisation. Employees expect from management the facilitation of pay entitlements, extrinsic and intrinsic rewards, resolution of internal conflicts, equitable opportunities for promotion and personal development in the context of complex technological challenges in stage 4. 0/5.0. On the other hand, customers and suppliers will exert indirect pressure on human resources management by making the final results of the services provided more efficient and by being more solicitous and serious in communication.

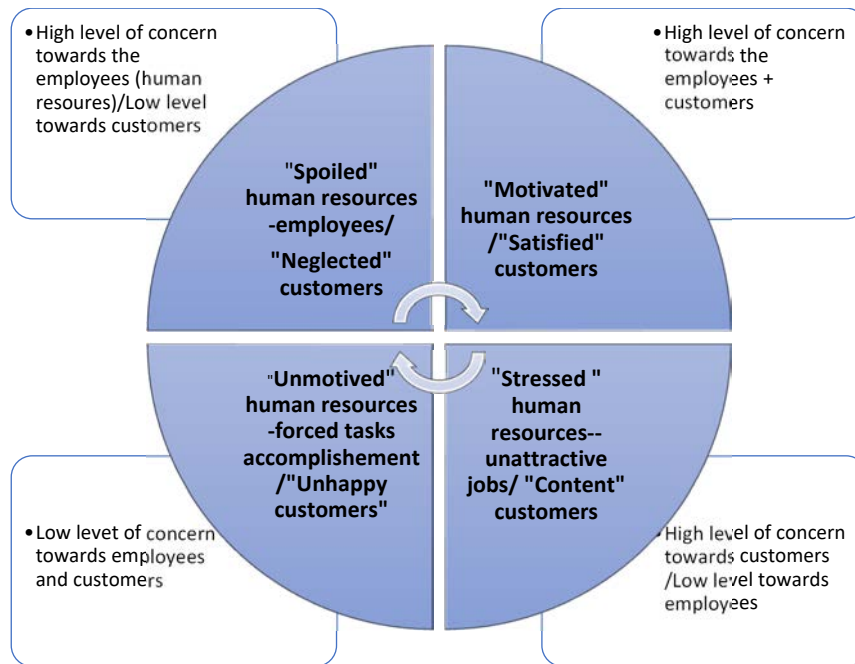


Figure 1. Matrix model diagram of concern level towards internal human resources needs and external customers goals. Source G.A.Cole (2000)

Thus, the human resources management activities in a production organization, particularized on the manufacturing sector of the garment industry, have not changed in the actual circumstances of the new industrial revolution, observed to the existing status in Romanian companies. They start from the idea of group management and management based on objectives at the level of the organization, under the conditions of minimal expenditure on personnel. Taylorist efficiency is active both at the level of "white collars" and "blue collars". At the same time new concepts and operating principles of the industrial technological wave based on IOT(Internet of things), AI (artificial intelligence), cyber entities, industrial robots and cloud databases require new personnel policies and procedures on the issue of upgrading existing staff to learn on the job. For strategic level managers, but especially for line managers, involved in solving operational tasks, a parallel responsibility is related to the personnel tasks, with the complete typical human resource management activities, especially for production operators as follows:

- Selection of human resources;
- Induction & integration of apprentices;
- Professional training on specific jobs and production operations;
- Periodical performance measurement and assessment of employees;
- Staff structuring upon specific jobs;
- Policy implementation referring to internal discipline rules;
- Policy implementation and control the compensation & rewards system;
- Team motivation;
- Set-up of adequate communication channels;
- Safe & security regulation implementation;
- Action plans to facilitate the company objectives implementation; as for example, a new IT platform and system set-up need a project management assignment with detailed measures directed to each work department involved;

All these tasks are complex and need to be undertaken in combination with other activities or specific projects related to operational flow, material assurance, IT equipment or budgeting. In this respect, the HR/personnel departments through their specialists can provide support and specific actions, as follows:

- Establish the HR strategies, on long terms, taking into account to innovate and use the technological facilities offered by the Industry 4.0 entities;
- Consultancy and profiled services exemplified by the needed documents of contracts, job description design, job analysis and design, job profiles;
- Undertaking the operational tasks of recruiting, selection, induction and initial training on the job, assigned to either specialists or instructors.

In view of the changes brought about by the phenomenon of digitization, IOT, or AI, in which most of these activities can be automated, and especially in conditions of a degree of automation of processes and the expansion of industrial robots assisted or not by human staff, the question arises whether and how much of the bureaucratic staff is necessary. Imperatively, the category of consultants and personnel managers is entering a new framework of action and role playing, due to the changes that may occur in job descriptions, the way of performance evaluation for semi-automated or robot-assisted industrial processes, as well as the continuity of training topics and methods, which require IT specialists, innovative technicians and qualified engineers, permanently connected to technological changes. Therefore the new profiles and communication facilities brought by Industry 4.0 demand customized competencies upgrading the job profiles. Consequently, the entire process of HR management requires a complete revision of all the activities starting with selection & recruiting the personnel and particular approach for the manufacturing operations related to:

- Induction of new employees, keeping in mind the actual lack of attractiveness of routine or time investment for skilled or manual productive activities. This is confirmed by the research and paradigm issued by Schoenhals (2021) who identified the perception of coercion determined by regular, mandatory or not audience recognized tasks
- Training methods and career development to stimulate the transformation into a HPWS (high performance work system) which is based on the features of egalitarianism & engagement, shared information & trust, knowledge development, performance reward linkage (Snell, Morris, 2019);
- Updating performance management system of measuring the results, in order to lead towards a fair and motivating system of rewarding human resources, taking into account besides the organisation's objectives, mostly the measurement of competencies which are created inside the company. They could become more visible working to fulfill the need of recognition of people. This is an immediate consequence of mass customization feature of actual industrial revolution. It is not just a market demand, it is a reflection on each individual who needs to feel the consideration for his particular contribution.

Research problem

Looking at the evolution of means of production and technological facilities, it becomes obvious the discrepancy between the technical progress and lack of updating of HR managerial tools to develop the human resources becoming interested in industrial manufacturing jobs. The main feature of production entity within the actual industrial is the SMART FACTORY demanding SMART employees. The candidates shall be attracted by using SMART persuasive managerial strategies, capable to convince them that their future jobs are important and useful both for them and for the organization.

They could be exemplified on a case study representation concerning a profile of premium clothing production organization operating in Romania, representative in terms of credible and stable position on the market. The permanent company concern was related to training and maintaining a skilled workforce, modern technology to determine high level of quality and professional services for clients creating profit. The organization has successfully overcome the extremely difficult period of the Covid 19 health crisis, despite losses and shrinking demand specifically for premium clothing and maintaining top positions as market leaders in their products. For reasons of confidentiality, no names or other particulars of recognition of the enterprise will be specified.

The study takes into account the organization structure and HR managerial practices. The function-based structure is specialized by assigning activities and responsibilities to a common function. As a result, all production matters are unified under the control of a production manager, or technical manager, and HR & personnel matters are the primary responsibility of the personnel manager. Specialisation by function gives employees throughout the hierarchy the opportunity to work towards a common goal. This

type of structure allows the accumulation of experience on a particular level of activity, encouraging specialists know-how through on-the-job learning and the exercise of management by objectives. One of the main characteristics is that line relationships through direct supervision over subordinate employees derive from both the operational and managerial chain. Senior function managers have authority over both line employees and those in their own functional areas. A manager involved in HRM (human resources management), such as a HR department manager, is recognized as a position by all levels of operations, along with those in the department that provides direct service to personnel activities such as payroll, document management, employment contracts, etc. He or she has the same level of position in the hierarchy of the organizational structure as other operational or functional level managers. This type of structure provides several advantages to the organization such as:

- employees are grouped according to technical job components or specialties;
- the assignment of employees with profiled skills is facilitated;
- predictable promotion paths are created within the organisation;
- control of activities is centralised at function level;

On the other hand, there are some aspects that are considered disadvantages from HRM's point of view:

- -qualifying by function tends to encourage fragmented group interests, different from those of the organization;
- -difficulty of adaptation and low flexibility, due to the centralisation of functions which creates strong managerial positions on specialised functions and imposes more formalised communication relationships between departments, often competing with reporting to strategic management.

Methodology approach

Concepts and theories related to Industry 4.0-5.0 are still new and yet developing, based on empirical studies, which do not work always across the board. For this reason, the research methodology is based on recent literature review and primary data collection from articles published in the last 7-8 years.

In parallel, we have also drawn on established formal theories of human resource management, in particular performance management and the recent concept of HPWS (human performance work system).

Regarding the theories of the socio-technical system, which define the organization of production, the concepts of W.P. Newman were chosen, because from an ontological point of view they point to the actual reality, versus the old concept of Davis and Trist. Upon a brief review of conclusions obtained by WRU (work research unit) in Great Britain, the job content approach shall be related to the following principles:

- activities must ensure a certain diversity of work pace, methods and skill level;
- activities must allow for feedback on employee performance;
- activities must allow a certain degree of freedom of action;
- work positions and work organisation must provide opportunities for learning and development
- jobs must provide prospects for the future;
- objectives must be clear and ensure the opportunity to participate in decisions on the positions filled;
- the job holders must have at their disposal all the resources appropriate to the activity carried out;
- employee relations procedures must be agreed between management and employees;
- remuneration systems must be designed in a fair way, in relation to the contribution made;
- personnel policies must be fair and appropriate;
- physical conditions of the working environment must be of reasonable quality.

The traditional concept of scientific management of Taylor (1911) still functional on most of manufacturing production organizations is not effective any longer, as it is proved by the actual labor market affected by scarcity of work human power. Staff fluctuation, absenteeism, lack of interest and poor retention of the workforce are some examples of the long-term failure of the concept, which is strongly reflected in the current staff turnover, disinterested in the routine, monotonous work still prevalent in manufacturing garmenting companies. The positive aspects of clear measurability of performance through knowledge of the objective and the possibility for the employee to have feedback by measuring the outcome of the work need to be maintained, the other features needing change.

This study proposed the five concepts of W.P.Newman to approach the work station design in order to improve the performance and four principles of HPWS-Snell & Morris to improve the human labour performance by adding new competencies Industry 4.0 to the specific of core profile. The key concepts W.P.Newman are briefly iterated below, recognized for the latest impact on SSH(social science and humanities).

A.1. Key concept 1 W.P.Newman (2020): "Industry 4.0 systems are socio-technical systems", because all work system are assumed to include social(human) and technical(machine) elements. W.P.Newman argued that" there are no I4.0 systems that do not engage humans across the life cycle in designing, installing, maintaining and operating". Attention to the demand on the people performing these tasks is therefore a design requirement.

A.2. Key concept 2 W.P.Newman (2020): "Attention to HF(human factor) must occur throughout design.The lowest cost and maximum opportunity with the best cost-benefit results come from considering HF from the earliest stages and then throughout design project".

A.3. Key concept 3 W.P.Newman (2020): "Human system interaction engage perceptual,cognitive and motor systems .For this reason,I4.0 system designers must ensure that the demands of their design are matched with human sensory, cognitive and motor capabilities or they risk negative outcome for the human or for the sociotechnical system as a whole.

A.4. Key concept 4 W.P.Newman (2020): "People have psychosocial needs. If I4.0 technologies are used to provide automated performance monitoring and enforcement of employees working to a defined pace,then one might hypothesize that employee's sense of control and job autonomy at work will decline and overall psychosocial profile will shift towards the high strain associated with negative outcome".

A.5. Key concept 5 W.P.Newman (2020): "Organizations tend to" drift to unsafe states... which explain, why industrial revolutions or fads like lean system have been seen as contribution to occupational injuries, accidents and deaths. If I4.0 innovations are to try and break this pattern, then system approach to apply HF in design is needed."

Upon the above iteration and applying to our case study from manufacturing industry, several examples are matching the key concept one, three, four and five. Most of the organizations make changes into the system thinking to the shareholders benefits more and then trying to fit to existing and future capabilities of labor force. For instance, an IT system collecting data from work stations which has not instructions translated for the operators, risk to fail if is not well explained to the working team. Also if there is any automate machine installed which oblige the operator to a faster pace from the first working day could jeopardize the policy of automatization concept. Besides, the reward system shall be motivating the operators who are going to be transferred to a new cutting edge machines, not only by changing the target of performance, but fairness in appreciating the efforts who are made to adapt and learn new techniques. Hence, approaching I4.0 from technology driven approach perspective falls short of systematic consideration of HF(human factor),which is vital needed.

The other approach of methodology provided by literature review is represented by HPWS concept with its particular parameters providing relevant points to develop a model solution for creating the interaction between an organization and potential labor force (human resources) based on common goal.Once the interaction is obtained, this is resulting into a performance which could be increased as much as the elements of HPWS are introduced into the sociotechnical system of organization. Herein a brief list of the main parameters of HPWS summarized from the book of Snell and Morris(2019) regarding the management of human resources:

B.1.-Egalitarianism and engagement: represent the principle of inclusion, people want a sense that they are members, not just workers, in a organization. Moving power downwards in organizations

empowering employees which could be obtained through job enlargement, enrichment and self-managing work teams(Snell,Morris,2019);

B.2-Shared information and trust: when employees are given timely information about the nature of their own work, business performance and strategies, they are more likely to make good suggestions for improvement and cooperation in major organizational change(Snell,Morris,2019);

B.3-Knowledge development: represent the shift from touch labor to knowledge work. Because of the dynamic and fast pace of technical change, knowledge and skill requirements must also change rapidly,with continuous learning(Snell,Morris,2019);

B.4-Performance reward linkage: when companies reward their employees based on their performance, workers are naturally pursue outcomes that are mutually beneficial to themselves. Often include group and organizational incentive pay and even skill based pay.

Approaching the inductive methodology of research, by collecting data from a part of the literature studied confirms the experiences of the real situations encountered. The statistical data found in the work of H.G.Adamkova (2020) show that the lack of attractiveness of the current positions offered in the field of industrial manufacturing production is determined by the fear of lack of job satisfaction and the possibility of achieving the required performance. Based on the mentioned studies and concepts, the actual research developed two assumptions as follows:

- Hypothesis no.one states the achieving performance through the organization's interaction as sociotechnical system with human resources, if human resources are motivated by work attractivity.
- Hypothesis no. two complements the previous statements, rationing the performance is based mainly on competences which human resource management practices should take into account the job analysis and job design stages,using the competency-based approach adapted to the Industry 4.0 stage.

The next step of deductive approach is targeting the exhibition of hypothesis, using the interpretative philosophy applied onto the concepts of HPWS upon Snell et All (2018) W.P. Newman (2018),the studies of Agola (2018) related to motivation of human resources, management practices within "smart factory" organizations of Industry 4.0 of Shamim(2016) and Sima (2020). They are illustrated first, onto figure no.2 under the title of performance model as a result of interaction between human resource-organization as sociotechnical system I.4.0.

The organization needs performance to achieve competitive advantage facilitated by technological factors Industry 4.0+5.0. with its transformation into "Smart factory"(Anouk ten Bulte, 2020) or if viewed as a socio-technical system from the perspective of the five concepts W.P. Newman. The human resources component attracted to the organization will interact with the organization as a socio-technical system being interested in meeting performance conditions (Snell, Morris, 2020). Performance, as a result of the interaction between the organization and human resources can increase, fulfilling the High Performance Work System conditions defined by Snell & Morris (2020), thanks to the technological factors of the Industry 4.0 work environment and the appropriate people management practices.

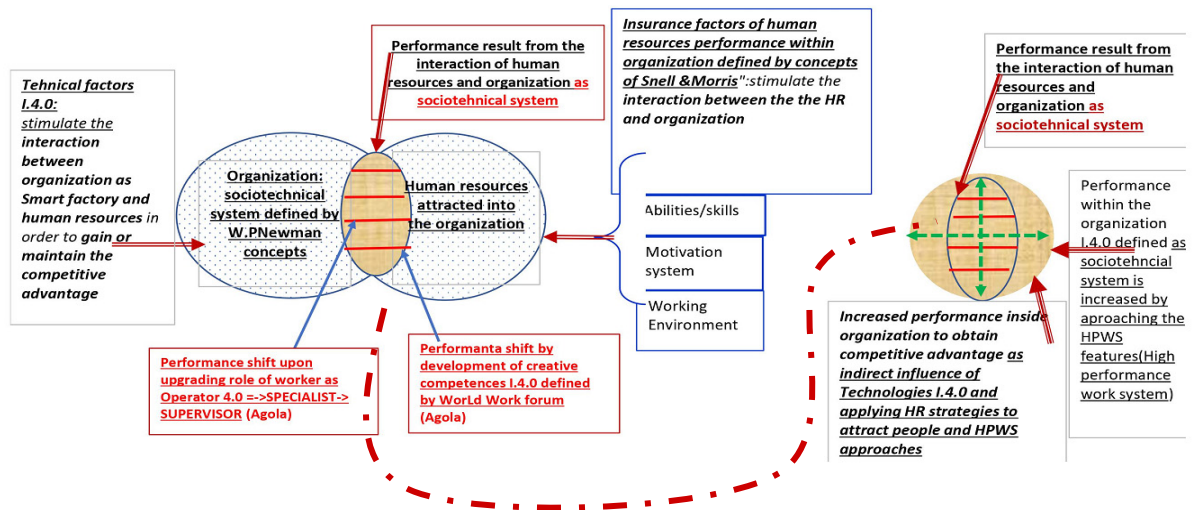


Figure 2. Performance model as interaction result between HR-organization as socio-technical system I.4.0

The exposition of hypothesis no.two is illustrated in the diagram of figure no.3, taking into account that at the basis of performance in the new context of the industrial revolution are the competences formed in the "Smart factory" type organization, defined after the job design & analysis.

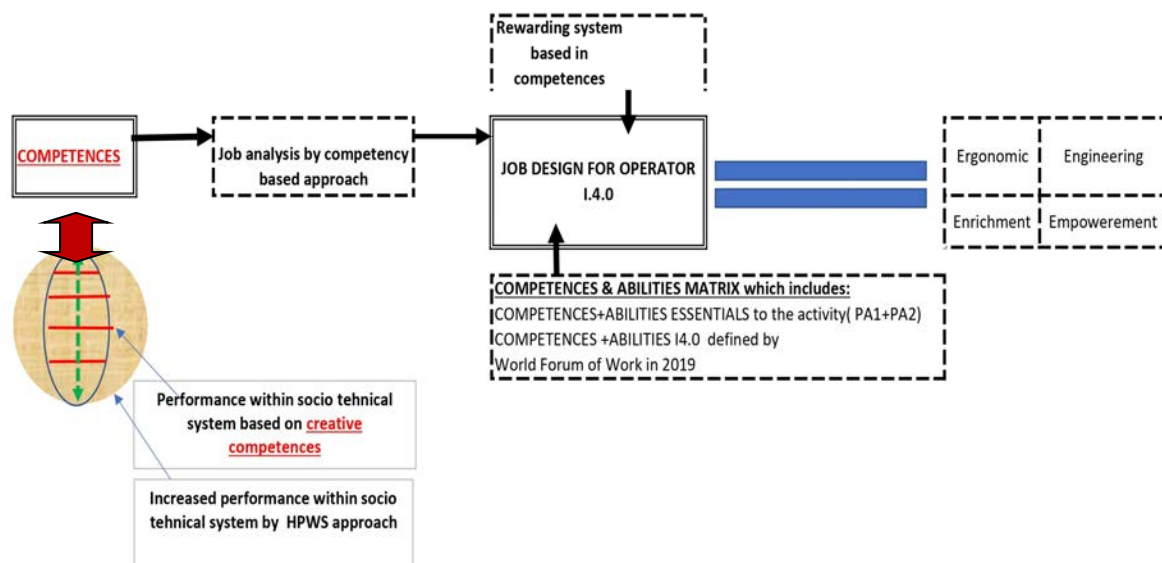


Figure 3. Job design HR I.4.0 based on competency based approach

The organization's offer to attract human resources for performance depends on job analysis and job design, as presented in the statistical data provided by H.G. Adamkova (2020) for ensuring job satisfaction. Starting from the assumption that performance is based on the formation of competences, these can correspond to the type of HPWS (high performance work system) approach that combines the essential competences of the specific productive activity with the general competences proposed by the World forum of Work in 2019, characteristic of the 4.0+5.0 industrial phase. The competency-based job analysis approach resulting in appropriate job design (Snell & Morris) can be further developed by introducing the Industry 4.0 competency matrix as proposed onto the research of next chapter and the competency-based reward system, shown in figure no.3.

Findings

Over the last decade, since the declared moment of the Digital Revolution 4.0, the technological transformations that have taken place in the industrial field have led to the effect of "technological determinism", with unpopular effects among employees threatened by job losses due to replacement by robots, on the other hand, in industrial manufacturing sectors such as textile and garmenting production, the negative effects have already been recorded, especially in the pandemic period, through the closure of less modernized industrial units, due to outdated communication systems. In their case, it was not the modernization of industrial equipment that was the cause, but flexibility to change and lack of jobs attractivity, which required speed of reaction in the internal communication process, control of information and speed of decision-making, as well as the precariousness of the IT system based on redundant procedures (manual checking of data entered into the system or input errors). These observed phenomena led small and medium factories to fall behind in the competition for customers, losing their competitive advantage, besides the interest of potential manufacturing operators related to the essential activity of productive process. The technical factors that features Industry 4.0 can boost the enterprise in the race for competitive advantage and can be customized as sources of working tools according to the nature of the activities to stimulate internal human resources.

The winning players that have survived have been those that have constantly invested in re-technologization both in equipping the flow of productive assets, but especially in support and management assets, thus allowing faster reaction speed to environmental phenomena, in order to take managerial decisions of change, restructuring and retraining of the workforce, this field being naturally dependent on the human workforce. The Industry 5.0 stage, by recognising the exaggerated "digitise or dye" elements of the 4.0 stage, is characterised by a focus on the social element, the skilled and flexible human workforce, in order to gain the advantages of digital technology components and to combat the threats already recognised and demonstrated by SSH scholarly research of Ozdemir et al. (2018) as the four assimetries I.4.0. In this case, the change phenomena imposed by the Industry.4.0-5.0 wave requires a greater contact with the outside of the organisation, in order to understand and adapt to new dynamic, linked to the growth of digital skills and technologies on the market. At the same time, a greater focus is needed on the core of middle management and specialists to serve the needs of qualification, training and possible retraining, in order to build occupational profiles adapted to the new requirements of Industry 4.0-5.0, through the HPWS job design of job enrichment, empowerment and professional motivation of employees. The changes being rapid and dynamic, proved by the researches results of SSH, all components of the HR profile must be "on alert", to possible opportunities that may be proposed to strategic management to improve the internal organisational environment and ensure success. Current data, especially after the worsening of the health crisis, which has hit hard the Romanian garment industry (with Covid lockdown for non-essential products), indicate the downfall of organisations that have hesitated to encourage the initiative of specialists and have delayed introducing IT systems for real-time control and monitoring in support of management, rather than looking for strategies of replacing the operators personnel. The last one has been proved to be non-lucrative for the organizations which need qualified resources, especially related to dexterity and skillful operations in production. The actual research is focused on designing the needed job profile for the category of productive direct workers who are not any longer simple executors and shall be interested into a practical, but more attractive content. The performance of a manufacturing organization is based on the efficiency of this category of practitioners whose competencies and abilities for their essential work shall be combined with those outlined by the World Forum of Work in 2019, called here as ten essential qualifications of a specialist I.4.0/5.0, as presented on the figure no. 4.



Figure 4. Essential qualifications of specialist Industry 5.0. Source *World Manufacturing forum* (2019)

The enclosed table no.1 show the summary of core matrix competences needed for apparel factory used as case study for their activities. It can be seen that they are separated into skills or abilities codified with letter “A” and competences codified with letter “C”. According to the subsumed characteristics, skills (aptitudes) are generally related to inclinations, talents, which cannot be learned through education, but can be developed through experience and training. In the case of competences, they are formed through a process of formal, experiential training.

Table no.1-Summary of core matrix competences needed for apparel factory core activities

Activities	Abilities: precision +speed: PA1	Abilities: versatility+precision: PA2	Competence: analitical, organizing, com- munication: PC3	Competence: technical expertise, research: PC4	Competence: creative PC5
Essentials Production:	5	5			
Tehcnical/devel- opment		3	5	5	5
IT:			5	5	4
Marketing, Comercial			5	4	4
Financial			5		
HR			5	5	3
Scale: 1-minimum 5-maximum					

Separately, the same activities are analyzed to see the adequate matrix of which from the ten qualification I.4.0 could be suitable for an upgraded operator I4.0/5.0 into a manufacturing production job, beside the core competences. The data of research are presented onto the enclosed table no.2 entitled as matrix competences I4.0 for a manufacturing organization. Their mix can be different depending on the manufacturing profile, the weight of each competence being determined by the measurement tools used for assessment. Further, this study is proposed to illustrate an example related

to the clothing industry by using the job analysis in the organization, having an outcome with job design on competency-based approach (Snell & Morris).

Table no.2-Matrix competences I.4.0 for an upgraded operator I.4.0 into a manufacturing job

Activities	Essential qualification of specialist Industry5.0									
	#1C	#2A	#3C	#4A	#5C	#6C	#7A	#8A	#9C	#10C
Essentials Production:					5			5	5	5
Technical/development					1-5x			1-5x	1-5x	1-5x
IT:			1-5x		1-5x	1-5x		1-5x	1-5x	1-5x
Marketing, Comercial			1-5x		1-5x	1-5x		1-5x	1-5x	1-5x
Financial	1-5x	1-5x	1-5x		1-5x	1-5x		1-5x	1-5x	1-5x
HR	1-5x	1-5x	1-5x		1-5x	1-5x		1-5x	1-5x	1-5x
Scale: 1-minimum 5-maximum	1-5x	1-5x	1-5x	1-5x	1-5x	1-5x	1-5x	1-5x	1-5x	1-5x
Total	2x(1-5)	2x(1-5)	4x(1-5)		6x(1-5)	4x(1-5)		6x(1-5)	6x(1-5)	6x(1-5)

An example of an Industry 4.0 operator job design based on appropriate Industry 4.0 competencies, to which a competency-based reward system is applied, is shown in Table 3. The score used for the competency assessment is used to establish the appropriate reward system grid for motivating newly developed competency levels.

Table no.3- Job design upon matrix of competences I.4.0 approach

Competency matrix Employee 4.0:		Job design Operator I.4.0 element of:	Job design Operator I.4.0 element of:	Job design Operator I.4.0 element of:	Job design Operator I.4.0 element of:
Competences mix Operator=specialist 4.0	Scale measuring the cumulative competences for reward system: 1-5 (1-minim,5-maximum)	Ergonomic	Engineering	Enrichment	Empowerment
Essential for production: PA1: Abilities of precision +speed:	1-5	-wokstation height adjustment	-learning curves setting to monitor the performance progress	-SMART targets are defined to be attained based on the competencies matrix	-allow the operator's autonomy
Essential for production: PA2: Versatility+precision	1-5	-machine pace to be tunned together with worker natural movement,avoid fatigue of eyes and body	-design and organize the work station upons 5S system		-public recognition by the team
Essential I5.0(5C): Abilities to work physically and pshichologically safely with new tehnology	5	-translate instruction and set-up of native language for machine programming	-assign a coach/trainer		-possible promotion for recognized position as trainer for the other co-workers
Generale I.4.0(8A): Ability to handle increasing complexity of simultaneous and various tasks	5				
Generale I.4.0(9C): Effective communication skills with the team and other entities of AI,IT	5				
Generale I.4.(10C): Open mindless toward constant change, knowledge transfer from other domains	5				

Verification of the applicability of the competency-based performance model is proposed to be measured through several case studies, at the level of operators in a manufacturing industry, using the competency matrix I4.0, with a correlated reward system. The job design is taking into account as well the elements of HPWS as enrichment, empowerment, ergonomics and engineering of the activity and workstation. The assessment is done with a mix of quantitative and qualitative evaluation based on results and behaviors, adapting the model proposed by Avasilcai and Hutu(2011).

The examples are intended for the category of operators equal specialist I.4.0 as follows:

- for the case of a multi-skilled specialist with a 25-points score of competences of skill mix shown on Table 4;
- for the case of an operator benefiting from improved technology, by automating the equipment with a 19 points score of competences of skill mix shown on Table 5.

In both cases the performance results are rewarded on the basis of competences acquired and optimized over time, which are evaluated based on the scale score shown onto table 4 and 5. Each point can be quantified with a certain monetary value either in Euro or Ron, established by the organization's management according to its own rentability break-even point and profit margins.

Research limitation

The study is still under development for more practical applicable activities. For the moment shall be recognized the existing limitations which are represented by small base of examples provided by one manufacturing industry as apparel & clothing production. On the other hand, this field of activity is enough representative because the labor human factor is the main element to provide performance for the company.

The automatization level and industrial robots could not replace yet the human interaction with the machine which is decisive in this trade. The methodology is based only on literature review because the concepts and academic contributions are still new and subjected to empirical trials.

Practical implication

The Industry 4.0 factors are treated as facilities to become the opportunity for organisations growing towards the race for competitive advantage. The people shall develop their practical skills with the support of facilities provided by Industry 4.0 main technical factors. The measuring tools of competencies mix model propose specific targets which could be comprehended by all categories of human factors from managerial level to practical execution.

The research approach a field less explored, but representative for the manufacturing industry which at the end is the engine for society progress and existence. Therefore, the concern shall be focused on creating the attractivity for practical work with the adapted competencies and stimulation & rewarding system for human capital.

Conclusions

For social & human sciences is unfolding directions of performance research and concepts looking for updated incentive factors to motivate and attract the human resources for manufacturing industry. Industry 4.0 factors can be a source of learning, in order to obtain the mix of competences adapted to the manufacturing industry.

Increasing the individual and team performance of employees is based on the development of the 4.0-5.0 competences mix, developing the concept of mass customization at the level of incentive factors which stimulate the contribution of each employee through their particular skills and developed knowledge.

Thus, Industry 4.0 factors could become the opportunity to grow the organisation into the race for competitive advantage. The work experience of enterprises which succeeded to survive during the pandemic crisis shall be used as best practices, to build new direction of human performance researches, available for broad spectrum of industrial activities, not only in the IT industry niche.

Table no.4- Measuring the competences level of an operator =specialist 14.0. multiskilled -upon an quantitative and qualitative evaluation

Competencies employee 4.0:		Competencies measuring by results (quantitative evaluation)	Competencies measuring by work behaviours (qualitative evaluation)	Competencies measuring by work behaviours (qualitative evaluation)	Competencies measuring by work behaviours (qualitative evaluation)
Multiskilled: able to replace other co-workers, unblock bottle necks on the working flow	Scale measuring the cumulative competences for reward system: 1-5 (1-minim,5-maximum)	Productivity (80-85 % after a month):5 (70-79 % after a month):4 (60-69 % after a month):3 (51-59 % after a month):2 (50% after a month):1	Absenteeism level/ .monthly (>5 %):5 (>10 %):4 (>15 %):3 (>20%):2 (25%):1	Fast comprehension of machine programming, handling tips(within a week) :5	Capability of improvement for working method/ organizing the work station(within a month):5
Competences mix Operator=specialist 4.0					Output quality level of reworks >2%-5 >3%-4 >4%-3 >5%-2 >5.5%-1
Essential for production: PA2: Versatility+precision	5				
Essential I5.0(5C): Abilities to work physically and psichologically safely with new tehnology	5				
General I.4.0(8A): Ability to handle increasing complexity of simultaneous and various tasks	5				
General I.4.0(9C): Effective communication skills with the team and other entities of AI,IT	5				
General I.4.(10C): Open mindness toward -constant change.,knowledge transfer from other domains	5				

Table no.5- Measuring the competences level of an operator =specialist I4.0. trained on automated equipment –upon an quantitative and qualitative evaluation.

Competencies employee 4.0: Operation of assembly by automating sewing equipment		Competencies measuring by results (quantitative evaluation)	Competencies measuring by work behaviours (qualitative evaluation)	Competencies measuring by work behaviours (qualitative evaluation)	Competencies measuring by work behaviours (qualitative evaluation)
Denumirea competentelor Operator 4.0	Scale measuring the cumulative competences for reward system: 1-5 (1-minim,5-maximum)	Productivity (80-85 % after a month):5 (70-79 % after a month):4 (60-69 % after a month):3 (51-59 % after a month):2 (50% after a month):1	Fast comprehension of machine programming, handling tips(within a week) :5	Capability of improvement for working method/organizing the work station(within a month):5	Output quality level of reworks >2%-5 >3%-4 >4%-3 >5%-2 >5.5%-1
Essential for production: PA1: Abilities of precision +speed: 5					
Essential I5.0(5C): Abilities to work physically and psichologically safely with new technology 5					
General I.4.0(8A): Ability to handle increasing complexity of simultaneous and various tasks 3					
General I.4.0(9C): Effective communication skills with the team and other entites of AI,IT 5					
General I.4.(10C): Open mindness toward constant change,„knowledge transfer from other domains 1					

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THE EFFECTS OF THE COVID-19 PANDEMIC ON UNIVERSITY ACTIVITY

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Abstract

Purpose – In any field of activity, certain major changes cause disturbances in the smooth running of activities. The way we manage our work and adapt to change makes us stronger and helps us progress. The pandemic has been a real challenge for the students and the teachers. Education must be able to adapt to any crisis situation. The aim of this study is to find solutions that can be adopted in case a similar pandemic will have place in the future.

Methodology/approach - The study consisted in the realization of a questionnaire, distributed to the students from all the years of study in university, from the specialization Constructions Engineering and Management (IMC) of the Faculty of Civil Engineering from Cluj-Napoca. We proposed this study because we are directly interested by the opinion of our students and we wanted to offer them the opportunity to express themselves directly and freely on issues related to the university environment.

Findings – The Covid-19 pandemic was one of the biggest challenges faced by humanity in recent years. The pandemic has affected the countries' economy and it has had a major impact on the socio-emotional side, through the isolation restrictions imposed. In any field of activity the most important resource is the human one, which must be protected. The effects of the pandemic were also felt in education. School is both a place of study and a place where social and emotional skills interact and develop.

Research limitations/implications – The paper presents the results of a research, which aimed to determine the problems faced by students during the pandemic. Through the proposed analysis we wanted to identify the problems that affected and influenced the academic and social life of the students, due to the lack of physical interaction over a long period of time.

Practical implications – Achieving the desired results and increasing performance in any field of activity can only be achieved through a qualified and motivated human resource. The satisfaction of both students and teachers, the improvement of activities and the achievement of performances is the goal of any educational unit. We wanted to identify the problems and establish solutions and options so that, in the future, any similar situation can be managed efficiently.

Originality/value – The study takes into account a number of important factors that we considered to have had a major importance on the activities carried out. This process allowed us to perform an analysis on identifying the possibilities to fix the problems. The analysis was performed based on a questionnaire. Each questionnaire contained targeted questions, with easy-to-mark answers. In order for the answers to be authentic, the questionnaire was anonymous.

Key words: education, pandemic, teaching activity

Introduction

At the end of 2019, the crisis situation in China spread very quickly in all countries of the world. The very rapid spread of the virus has led to special measures adapted to this situation in order to protect people against this disease and also to prevent and limit the spread of the virus. [The Parliament of Romania, 2020] Studies conducted among young people show that the Covid-19 pandemic has caused both shortcomings in learning activity and an increase in the fear level, depression and anxiety caused by restrictive measures and school closure. The pandemic has had major changes in the normal way of people's lives as an effect, causing them to adapt to this crisis situation and survive. The pandemic did not affect people equally, its impact being felt differently. [The Romanian Academy, 2020,1], [The

Romanian Academy, 2020,3] This study aims to identify the main difficulties faced by students during this period and find appropriate solutions to solve these problems if such critical situations arise later.

Initial Data

Teaching and learning online has been a novelty for both teachers and students, who have had to adapt quickly and efficiently to this way of studying. [The Romanian Academy, 2020,2] Until the pandemic, technical education had no other form of teaching than face-to-face, all classes, both courses and applications, taking place at school. This was due to the specifics of the education system. Thus, changing this way of teaching in the online version was a real challenge for both teachers and students. Both the students' ability to adapt and their understanding of the notions taught were tested. At the beginning of the pandemic, the teaching was done exclusively online, then the transition was made to the hybrid system, with online courses and face-to-face applications.

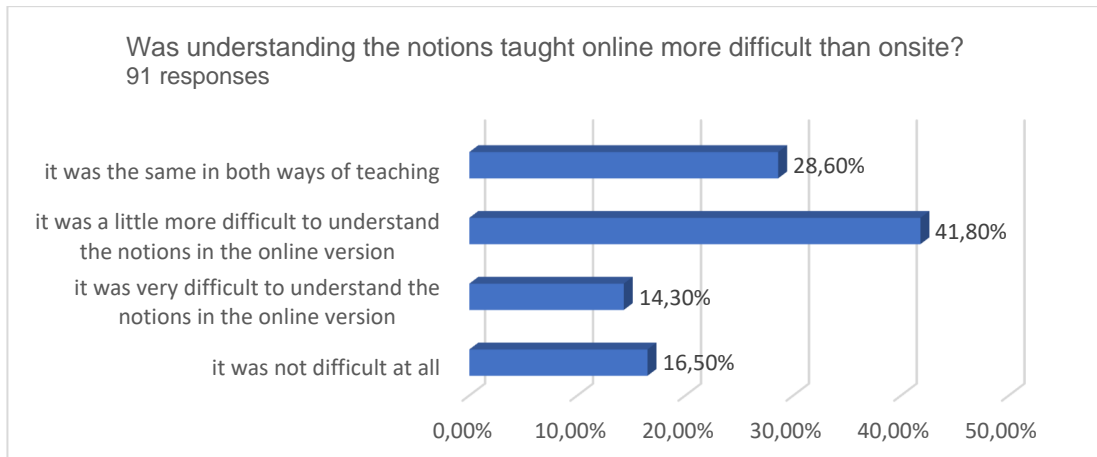
The study was conducted on the basis of a questionnaire prepared in Google Forms, which was distributed to students from all years of study from the Bachelor's degree in Engineering and Construction Management at the Faculty of Civil Engineering in Cluj-Napoca. The questionnaire consisted of 12 questions, 9 of them were multiple choice and 3 were narrative questions, the latter aimed to express students' views on the topics surveyed. The questions aimed to determine how the students adapted to the online learning activities, how they managed to understand and carry out the practical activities, respectively to identify the major problems they faced during the pandemic, related to learning and socializing. The inclusion of narrative questions allowed respondents to express their views on the activities carried out and the impact that online education had on them.

Case study

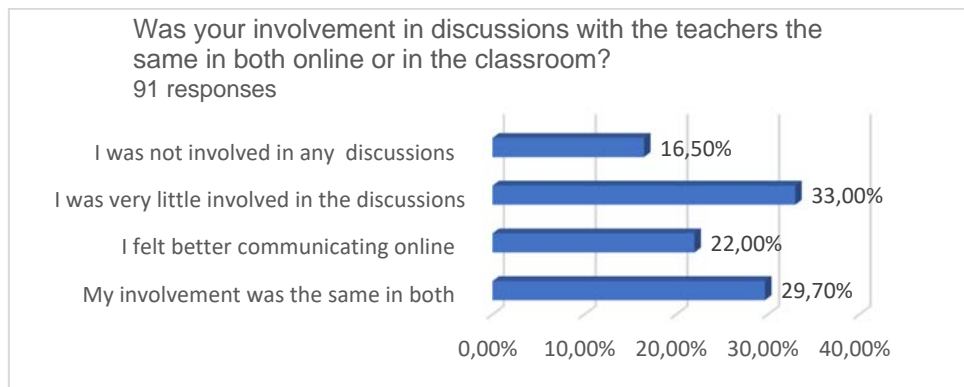
The studies related to the learning activity and the way of socialization during this period, as well as the students' opinions regarding these activities are important, because using them we can form an opinion about how we managed to go through and overcome the crisis period, about the lacks and needs we had and respectively about the way of managing these newly encountered situations. The educational platform used during this period of time for the didactic activity like teaching, evaluation and, respectively, communication outside of classes was Microsoft Teams. Each teacher had to adapt his teaching method and interact with the students, depending on the specifics of the taught subject. [Ciplea, S.A, 2017]

The case study is based on the analysis of the answers received from the students. What we wanted to find out was, mainly, how the students managed to adapt to this new form of distance learning. [Mircea, A., 2019] Other main aspects viewed the social side, the access to technology and the ability of concentration and socialization.

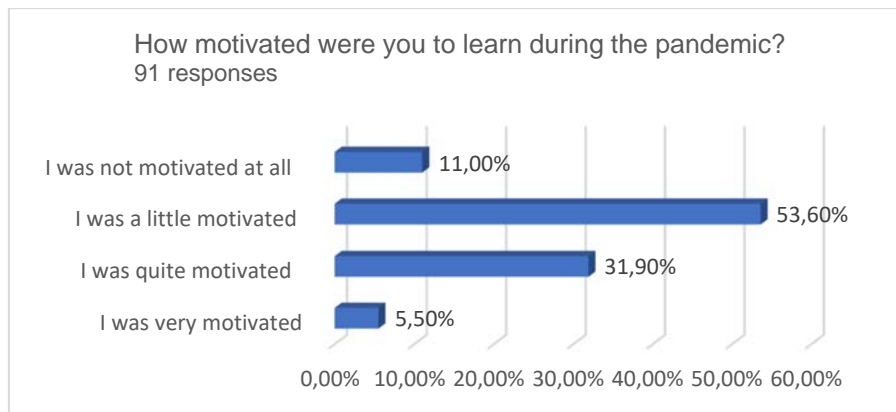
At the beginning we considered it important to find out how the notions taught in the online version were understood, 41.8% of the respondents had the opinion that it was more difficult to understand the notions taught in this form of distance learning. This aspect may be due to the impossibility of verifying the active presence of students at the course and applications, also checking the attention to the notions taught. The way the information was received was more difficult for the teachers to manage, because the students were protected by some images on the computer screen. Also, the students' attitude and their disinterest, sometimes their absence near the computer - for a longer or shorter period of time - were factors which determined that the understanding of the concepts was not as high as expected.



Another aspect that must be analyzed is the interaction between students and teachers in the learning activity. From the answers given by the students, it follows that a 33% percentage of them got involved very little in the discussions, and 29.7% said that their involvement was the same in both methods of teaching. A percentage of 22% of those surveyed answered that it was easier for them to communicate in the online version. The reduced involvement of the students in the discussions was due to the lack of face-to-face interaction and their comfort in the online learning activity, these factors appeared and intensified with the passage of time. Because of this, the teaching staff had to make an additional effort, compared to the classroom activity, in order to maintain the students' attention during the lessons.

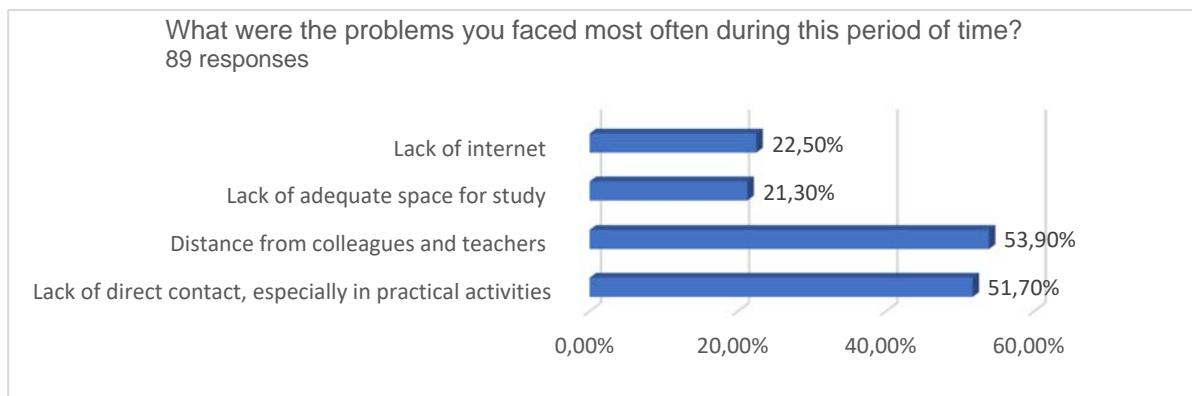


The fact that they were much less supervised at home than in the classroom and the disturbing external factors (characteristics of the online environment) were more numerous determined a lower interest in studying by the students, they often had a passive attitude and all this determined a decrease in the quality of education, during this period. Thus, the results show us that 53.6% of them were a little motivated to study during this period, and 11% of them were not motivated at all. The modification of the teaching method as well as the different interaction between the teacher and the student implicitly determined the modification of the students' behavior and attitude towards learning. A percentage of 31.9% of those surveyed had an attitude close to that of traditional teaching and were quite motivated to study during this period.

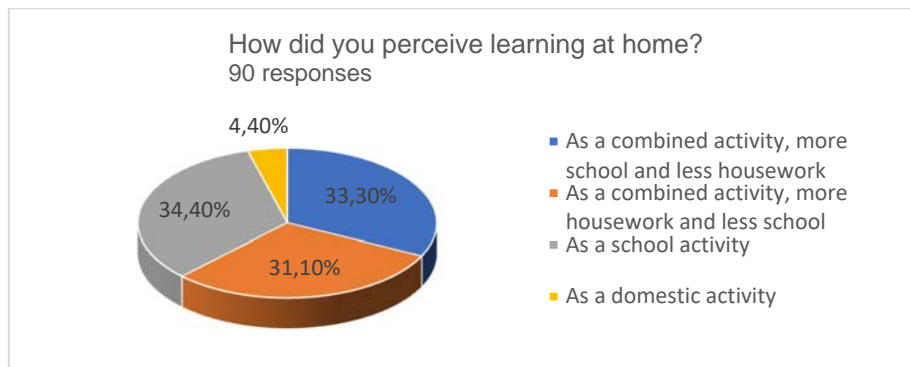


Analyzing the answers received to the question "What was the most important thing you missed during the pandemic regarding school activities?" we can say that the opinions were not very different. The vast majority of students felt the lack of socialization, direct interaction with colleagues and teaching staff, face-to-face communication, laboratories carried out at school, writing on the blackboard, teamwork, excursions, visits to construction sites.

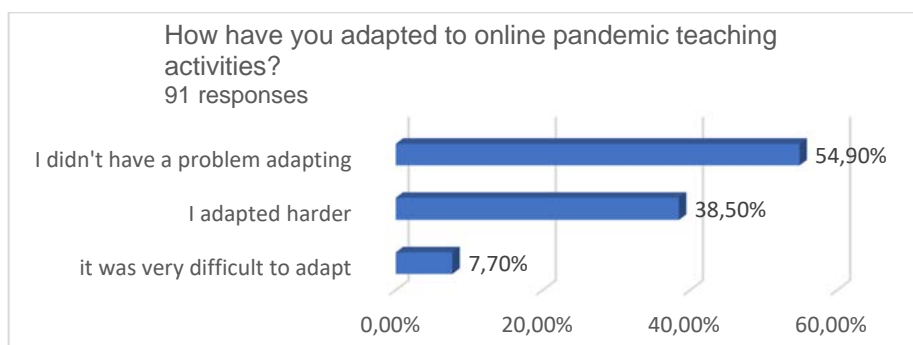
Another question aimed to identify the problems and the difficult situations that the students encountered during this period. From the answers received, it follows that more than half of the students felt a distance from their colleagues and teaching staff, respectively they lacked direct contact, especially during practical activities. Other problems were those related to the lack/failure of the Internet network, respectively the lack of a suitable space for studying. Learning from home is a difficult process for some students (due to technical difficulties, space, concentration difficulties) that may appear during the semester and that may lead, at the end, to worse results than if the activities were carried out in class.



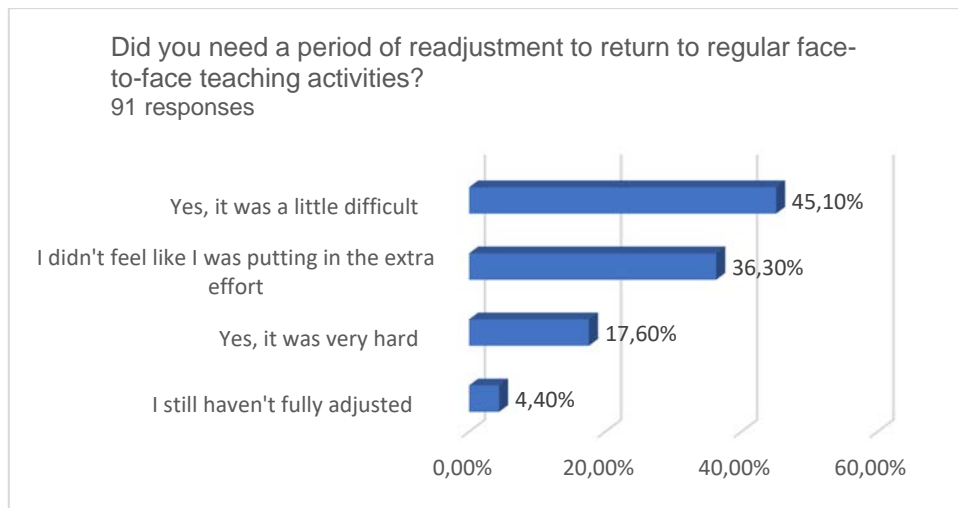
To the question "How did you perceive learning at home?" three of the four answers had a close percentage, around 30%. One of the three situations shows that the students adapted to the online environment quite well and are looking at the didactic activity as a school activity. Two of the answer options consider home learning as a combined activity between school and home activities. Learning from home can also have advantages such as mainly those related to the travel time to school, the facilities offered by technology, the possibility of attending classes from different locations. During this period, a greater presence of students was observed in the course hours, they had easier access to some information, the fast and safe distribution of some didactic materials was achieved. Also, online meetings facilitated the verification and easy explanation of certain information, such as those related to diploma projects, and information sessions were easily held outside of teaching hours.



From the answers received from the students, it can be seen that a large part of them (54.9%) did not have a problem with adapting to the new form of learning, and 38.5% adapted more difficult, but not with a great effort. Young people have the ability to adapt much more easily to changes in their lives. The online environment and technology is no longer a problem for many of them, young people having access to and using computers since pre-university education. The problem of adaptation may arise from the way everyone manages to be attentive, get involved, study and fulfill their school duties, at home not being constrained by certain factors specific to classroom activities.

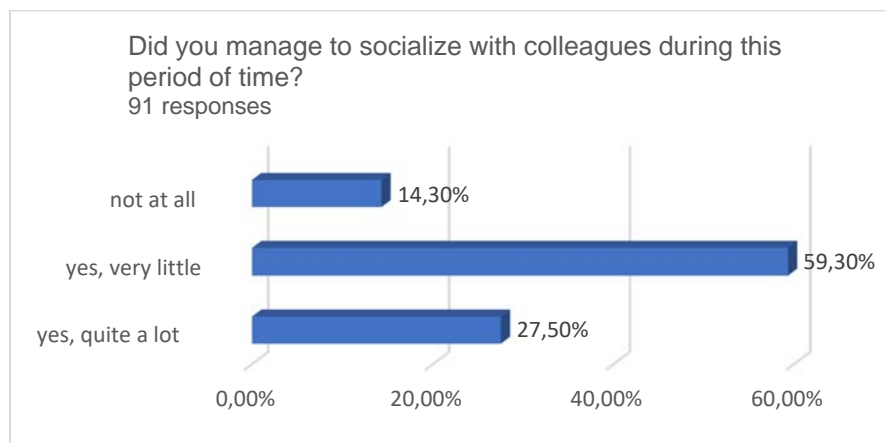


The purpose of the following question "Did you feel a rupture, a detachment from school activities, during this pandemic period?" was to determine how students perceived the change in the way of learning they were used to before the pandemic. Analyzing the answers received, we can say that most of the answers were affirmative. The period of the pandemic caused a break in the activity and the students' lifestyle and caused them to go back to their home city. The period of work from home extending over a rather long period, upon the end of the restrictions and the return to school, a large part of the students needed a period of readjustment. There were students who did not feel that they made an additional effort when returning to the usual way of studying. Some of the students felt that they made an extra effort and found it difficult to return to school. The answers were different because each of the students felt and tried to accommodate themselves taking into account their character and their ability to adapt.



From the answers received to the following question, it can be seen that what was missing most during this period was socialization and direct contact with those close to them, colleagues, friends, teaching staff. The meetings were possible only with the help of the computer, on the groups made on Teams or other social networks. People had to communicate, but in a different way than the one they were used to.

Because everyone's opinion is important, at the end of the questionnaire we wanted to find out the students' personal opinions related to the pandemic, things they faced and which we did not analyze in the questionnaire.



Here are some of the students' opinions: "It was quite a difficult change to go online, which I never thought about, but personally I think we have adapted, some students better, others less"; "I think it was more difficult for the teachers. In any case, we are glad that it passed"; "It helped the development of the education system by giving students the chance to learn about such era-specific schooling"; "It had advantages and disadvantages"; "A traumatizing experience"; "The pandemic has wasted that start of energy I came with in year 1 to meet new people, to learn new things. When I started physically in year 2 I no longer had the same energy that I had at the beginning, so I consider that the pandemic stole a part of my life, which is impossible for me to ever recover"; "Besides the epidemiological risk, it was a difficult period to manage at the level of emotional balance"; "The pandemic was a time when I realized how important direct contact is for learning performance"; "It's not a period that makes us happy, but I hope we managed to face it as good as possible".

Discussion and conclusions

The pandemic has had, for the most part, a negative effect on all people, but especially the youth have suffered the most. Isolation and distancing caused the appearance of several negative effects among young people. Meetings were no longer possible, handshakes were limited, hugs were stopped. It was forbidden to organize graduation festivities, both for young people who finished high school and for students graduating from the faculty. Admission to the college was done online and the freshman ball could not be organized either. [www.mediafax.ro, 2022] They are unique events in everyone's life, which, once they have passed, cannot be rescheduled or recovered.

The pandemic made us adjust to a different way of life, work, and learning. It determined the development of new skills and a different way of spending time. The home became a school, a place to spend time, a place to meet colleagues. Online learning was a recommended solution in this crisis situation, to reduce the number of infection cases and to ensure the protection of teachers and young people. The classes could be ran well, but this proved to be more difficult than in the face-to-face teaching system. The teaching staff's management for the understanding of the concepts taught, for capturing the attention of the students as well as checking the way of working in the practical activities, was very difficult to manage during this period, due to the lack of visual contact, a feedback from the students and a suitable environment for carrying out activities.

The fast evolution of information and communication technology currently has an important influence in the development of many fields of activity as well as in the development of communication relations achieved worldwide. The changes that appeared in education during this period determined the use of the computer system as a basis for study, an important element but which must be used with caution and a lot of responsibility. In the technical field, in particular, practical work must be carried out in laboratories with the physical presence of both students and the teaching staff. Change is a constantly present element in our life. The ability to adapt to changes and become better has become a basic characteristic of all humans.

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DYNAMIC CAPABILITIES AND HIGH-QUALITY STANDARDS IN S.C. JUNGHEINRICH ROMANIA S.R.L.

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Abstract

Purpose – highlighting the dynamic capabilities and high-quality standards in a multinational company that in the pandemic year 2021 recorded the best year in its history, reaching a turnover of over four billion euros.

Methodology/approach – holding a brainstorming session for creating ten working options, analyzing them according to ten relevant criteria in an advanced multi-criteria analysis and establishing their final ranking using a mathematical formula.

Findings – Jungheinrich is a green company which demonstrates high competence in consultative sales and after-sales service, fast response time, quality service to 5-star group-wide standards and customized solutions.

Research limitations/implications – the research is limited to the brainstorming ideas outlined and the results obtained from the advanced multi-criteria analysis of the resulting work options, with implications for future improvement of internal procedures.

Practical implications – there are strong foreign companies in Romania, which continuously reinvest their profits and can use the local market to optimize the development of the whole group.

Originality/value – conducting a quantitative and qualitative research on a German multinational company, which is developing in Romania using managerial know-how with almost 70 years of experience and which is in the top 50 best employers in Germany.

Key words: Jungheinrich, electric, logistics.

Introduction

In an ever-changing world, the dynamic capabilities of individuals and organisations become extremely important. These represent the ability to adapt to new situations, to face new challenges, to be always competitive and to have the power to develop continuously and sustainably (e.g., Helfat et al., 2007; Boșcoianu, Prelipcean and Lupan, 2018). Universally accepted quality standards exist worldwide, without which organisations cannot develop and contribute to technological development and overall economic growth. (e.g., Ronnen, 1991; Blind and Hipp, 2003).

At Jungheinrich there are certificates such as Eco Vadis for sustainability activities on a CSR performance monitoring platform, ISO 9001 ensuring the most significant standard in quality management at the production sites, ISO 14001 for the foundation in terms of active and effective environmental and sustainability performance, ISO 14040 certifying the first product life cycle assessment for a manufacturer of industrial trucks, ISO 50001 for energy management systems and ISO/IEC 27001 certifying the information security management system.

The brainstorming architecture and options selection

Our brainstorming session resulted in 90 innovative ideas from the ten most experienced employees of the Jungheinrich Business Services Center in Brasov, which were grouped into ten categories of eight,

nine or ten ideas each. The grouped ideas were used to construct paragraphs called work options (e.g., Wilson, 2013).

Option A: Good working conditions, pleasant atmosphere and helpful colleagues increase the cohesion of the employees. Offering complete modern equipment for hybrid home/office work increases employee enthusiasm for work.

Option B: Jungheinrich offers ongoing, sustained and effective online training for employees. To develop team spirit and encourage sports, physical and virtual meetings, thematic team buildings and frequent trips with colleagues are organised.

Option C: The opening of a Business Services Center in Brasov is part of Jungheinrich's development strategy. The gap between countries is reduced through an organised flow of information and the use of modern communication channels. It is intended to use local suppliers and to conclude contracts with them for large values.

Option D: According to the principles of team leadership, to avoid employee overload, the team will be expanded into new spaces with a slow adaptation of new colleagues. Coordination between departments and the dense organisational chart should be optimised, as inherent imbalances such as the uncertainty of war constantly arise.

Option E: Implementing future technologies requires investment in research, development and innovation of competitive products. Market dynamics and the need for continuous improvement force the company to use up-to-date software and to optimize the website.

Option F: Jungheinrich is a green company with its own electric charging stations and has stopped the production of diesel-powered forklift trucks. It wants to develop new electric equipment with lithium-ion batteries, which have a low carbon footprint. Although lithium-ion batteries cost twice as much as lead-acid batteries, modern lithium-ion technology is more cost-effective.

Option G: Jungheinrich offers its customers comprehensive services and solutions for the equipment it sells. Support in the use of the equipment is offered and quality standards are imposed on customers. To be close to the current needs of the companies, used equipment is offered for rent, the share of online trade is increasing and back-office support team for sales representatives is being developed.

Option H: Multinational organizational culture and German management ensure optimized complexity and compliance with legal requirements. The gradual implementation of the automation of procedures is carried out in consultation with colleagues and in accordance with planned schedules. To improve Jungheinrich's image, donations are made to charities and the customer evaluation service is outsourced.

Option I: To ensure speedy deliveries, transport services have been outsourced. Logistics optimisation is achieved through customised hubs and the development of own vertical warehouses. Jungheinrich is ready to get involved in PNRR projects with sales-related stocks and its own showroom.

Option J: Jungheinrich offers competitive advantages through competitive products and all-inclusive maintenance contracts. The after sales department maintains new and used equipment with original spare parts and specialised service technicians.

An application for the advanced multi-criteria analysis of the resulting work options

The ten analysis criteria were established by the authors based on their scientific experience and considering current market conditions and constraints:

Criterion 1: dynamic capabilities paradigm

Criterion 2: logistics management

Criterion 3: procurement digitalisation

Criterion 4: National Recovery and Resilience Plan

Criterion 5: European Green Deal

Criterion 6: electrical logistics equipment production

Criterion 7: electrical logistics equipment refurbishment

Criterion 8: high-quality standards

Criterion 9: management challenges and opportunities

Criterion 10: post-pandemic reality

The criteria are compared two by two, giving a value of two for the most important criterion, a value of one in case of a tie or when the same two criteria are compared and a value of zero for the least important criterion. (Table 1) A total, a hierarchy by level and a weight for each criterion are calculated by a mathematical formula. (Figure 1) For the analysis of the ten work options according to the ten established criteria, single non-repeatable scores from one to ten are awarded (Table 2). To establish a final ranking of the options, the weights for each criterion are multiplied by the scores awarded and the results obtained are added together for each option (e.g., Toth et al., 2022b). The highest ranked option in the analysis is option F (Table 3). According to this option, Jungheinrich is a modern company that is abandoning outdated technologies and investing in new and innovative technologies.

Table 1. Calculating the weight of each criterion

Criterion	C ₁	C ₂	C ₃	C ₄	C ₅	C ₆	C ₇	C ₈	C ₉	C ₁₀	Total	Level	Weight
C ₁	1	2	2	2	2	0	0	0	0	2	11	4,5	1,88
C ₂	0	1	2	2	2	0	0	0	0	2	9	6	1,30
C ₃	0	0	1	2	0	0	0	0	0	2	5	8,5	0,45
C ₄	0	0	0	1	0	0	0	0	0	2	3	10	0,17
C ₅	0	0	2	2	1	0	0	0	0	2	7	7	0,85
C ₆	2	2	2	2	2	1	2	0	0	0	13	3	2,77
C ₇	2	2	2	2	2	0	1	0	0	0	11	4,5	1,88
C ₈	2	2	2	2	2	2	2	1	2	2	19	1	8,90
C ₉	2	2	2	2	2	2	2	0	1	2	17	2	5,64
C ₁₀	0	0	0	0	0	2	2	0	0	1	5	8,5	0,45

$$W = \frac{CT + (CT - LT) + CP + 0,5}{(HT - CT) + \frac{NC}{2}}$$

- W – weight
- CT – each criterion total
- LT – lowest criterion total
- CP – number of criteria passed
- HT – highest criterion total
- NC – total number of criteria

Figure 1. Weight calculation

Table 2. Scores awarded to each work option according to each criterion

Criterion	Options	O _A	O _B	O _C	O _D	O _E	O _F	O _G	O _H	O _I	O _J
C ₁		8	9	10	9	8	6	8	8	6	5
C ₂		6	7	6	6	6	3	6	3	8	6
C ₃		5	5	5	5	4	4	3	2	5	4
C ₄		1	1	2	2	1	1	1	1	4	1
C ₅		2	2	1	1	2	5	2	7	1	2
C ₆		3	3	3	3	7	8	5	5	2	7

C ₇	4	4	4	4	3	7	4	6	3	8
C ₈	10	10	8	8	10	10	10	10	10	10
C ₉	9	8	9	10	9	9	9	9	9	9
C ₁₀	7	6	7	7	5	2	7	4	7	3

Table 3. Calculation of the final hierarchy of options

Options \ Criterion	O _A	O _B	O _C	O _D	O _E	O _F	O _G	O _H	O _I	O _J
C ₁	15,0	16,9	18,8	16,9	15,0	11,3	15,0	15,0	11,3	9,4
C ₂	7,8	9,1	7,8	7,8	7,8	3,9	7,8	3,9	10,4	7,8
C ₃	2,3	2,3	2,3	2,3	1,8	1,8	1,4	0,9	2,3	1,8
C ₄	0,2	0,2	0,3	0,3	0,2	0,2	0,2	0,2	0,7	0,2
C ₅	1,7	1,7	0,9	0,9	1,7	4,3	1,7	6,0	0,9	1,7
C ₆	8,3	8,3	8,3	8,3	19,4	22,2	13,9	13,9	5,5	19,4
C ₇	7,5	7,5	7,5	7,5	5,6	13,2	7,5	11,3	5,6	15,0
C ₈	89,0	89,0	71,2	71,2	89,0	89,0	89,0	89,0	89,0	89,0
C ₉	50,8	45,1	50,8	56,4	50,8	50,8	50,8	50,8	50,8	50,8
C ₁₀	3,2	2,7	3,2	3,2	2,3	0,9	3,2	1,8	3,2	1,4
Total	185,7	182,8	171,0	174,7	193,6	197,4	190,3	192,7	179,6	196,4
Final hierarchy of options	6	7	10	9	3	1	5	4	8	2

Discussion and conclusions

Jungheinrich was the first manufacturer to implement lithium-ion batteries in materials handling equipment more than ten years ago. Jungheinrich presented the first lithium-ion battery equipment model at the CeMAT 2008 trade fair. At CeMAT 2011, Jungheinrich was the first company in the world to present the series production launch of a lithium-ion battery-powered pallet truck, which featured higher safety, no maintenance and a longer life cycle. The battery weighed only 14 kg and reduced the weight of the equipment by 150 kg compared to lead-acid batteries equipment. Changing the battery was simple, with a suitcase-like handle. LogiMAT 2018 saw the unveiling of the first forklift truck with lithium-ion battery, revolutionising logistics equipment production.

Lithium-ion batteries are two-thirds smaller than lead-acid batteries, which has helped create compact equipment sizes, more space for forklift operators, greater safety and stability and are more cost-effective and sustainable. Jungheinrich contributed to the development of these batteries from the very beginning, when the price of lithium-ion cells was ten times higher than today. Since 2014 the trend has changed due to lower costs and longer periods of use, now batteries no longer need to be changed regularly, some being incorporated. Lithium-ion batteries cost twice as much as lead-acid batteries, but over time they prove to be more efficient. Although they consume more energy during production, they have a 21 percent smaller carbon footprint than lead-acid batteries. Lithium-ion technology is expected to be the standard within five years and refurbishing used batteries will extend the life of the cells.

A new model of lithium-ion technology-based equipment, with a new design and compact dimensions for narrow aisles, was considered "Best of the Best" by the Red Dot Design Award jury in 2021. It recognises that it is in a truck using an ultrasonic sensor that automatically activates the headlights to illuminate the loading area and reduces speed giving more safety. By replacing 48-volt technology with 24-volt technology, energy savings of up to 30 percent are achieved. The company has joined the Science Based Targets group, using only green energy in Germany and will implement this principle in other countries. To generate its own solar energy, some sites are equipped with photovoltaic systems.

EcoVadis rating agency has awarded Jungheinrich its highest sustainability certificate of platinum in 2021, which ranks the company among the most sustainable one percent of the world's companies out of more than 85,000 companies rated. Jungheinrich combines social and environmental responsibility with profitable growth, shaping the intralogistics services and logistics platforms of the future. Highlights

include environmental measures, its own labour and human rights code, sustainable procurement, commitment to the Paris climate goal of a 1.5-degree temperature reduction and the desire to achieve group-wide climate neutrality.

Former Formula 1 world champion Nico Rosberg became Jungheinrich's brand ambassador in 2021 until 2025 and will represent the company in promoting the campaign "we are the pioneers of intralogistics" in the process of digitalization, globalization, opening up to Asia, urbanization, density, climate change, resource scarcity, e-commerce, innovation, sustainability, electric mobility, integrated solutions, electric drive, automation, promoting the green economy and vertical agriculture in Kuwait in small spaces.

The company is highly competitive in its products and services, invests heavily in research, has a multinational organizational culture, has weathered the supply chain disruption during the coronavirus crisis by quickly finding alternative sources of supply and participates in corporate social responsibility programs. Since 2012 Jungheinrich donates annually to humanitarian actions in Tanzania, Haiti, Afghanistan and DR Congo. Jungheinrich actively participates in increasing the logistics flow and automated logistics capabilities of its customers through warehouse redevelopment, modern transport systems, fleet management system to improve productivity and increase warehouse security. To expand into the market of automated warehouse logistics systems, the automation company Arculus was acquired in 2021, which produces autonomous mobile robots and software solutions for mobile automation.

As a result of managerial implications, the company is growing faster than anticipated in all six areas of activity: automation, digitalisation, energy systems, efficiency, global footprint and sustainability. Besides intralogistics, it plans to expand into electric construction machines, agricultural machines and complete energy solution in collaboration with other companies. Hybrid working and creating a digital working environment at the highest level will attract quality human resources. From 2021 Jungheinrich has been relisted in the MDAX index, from 2022 the company implements a gender-neutral language and from 2023 a new plant will open in the Czech Republic, which will produce reach trucks. By 2025, the aim is to achieve revenues of 5.5-billion-euro, 20 percent revenue outside Europe, 70 percent lithium-ion equipment and continuous improvement, over 18 percent of managers to be women and climate neutrality as a sustainability factor.

The main contributions of this research are related to brainstorming ideas of the ten most experienced employees from the Jungheinrich Business Services Center in Brasov. The advantages of this research are expressed through the development of a multinational company, world leader in intralogistics solutions, which in the pandemic year 2021 had its best year ever with a turnover of over four billion euros and the potential for future growth in the coming post-pandemic years, respecting the European Green Deal provisions and the investment opportunities offered by the Next Generation EU funding.

The limitations of this research are related to the brainstorming ideas, the analysis criteria, the advanced multi-criteria analysis of the work options resulting from brainstorming session, the mathematical formula used, the final options ranking and the information collected from internal company sources. Future research will consist of analysing the company's progress in achieving the 2025 strategy goals, investing in new technologies, reducing costs and resource consumption. A new refurbishment plant will be developed in 2022 in Ploiesti, Romania, where some old components of used electric forklift trucks and electric pallet trucks will be replaced with new ones and other components will be cleaned and repainted, the resulting product being very similar to a new one.

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ELECTRIC FORKLIFT TRUCKS REFURBISHMENT AT S.C. JUNGHEINRICH RECONDITIONARE ROMANIA S.R.L.

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Abstract

Purpose – developing an electric forklift trucks refurbishment business in 2022 in Ploiesti in a period of hyperinflation generated by the COVID-19 pandemic and the war in Ukraine, with German managerial know-how and lower costs of local suppliers.

Methodology/approach – conducting a SWOT and ESG analysis of the refurbishment business, a CO₂ emissions comparison between diesel-powered and electric forklift trucks with lead-acid and lithium-ion batteries.

Findings – Refurbishing electric forklift trucks extends their life cycle by 94 percent and saves around 80 percent of CO₂ emissions compared to new production. An electric forklift truck with lithium-ion battery emits 52 percent less CO₂ than a diesel-powered forklift truck.

Research limitations/implications – the research is limited to SWOT and ESG analysis and internal documents provided by the company with implications for the local economy development.

Practical implications – Jungstars brand lithium-ion battery electric forklift trucks refurbishment business offers sustainable and resource-efficient solutions, the resulting equipment looking and performing as good as new.

Originality/value – the main author of this paper, as an employee of the purchasing department, actively participated in the opening of this new forklift trucks refurbishment plant, looking for local suppliers needed for the smooth running of the business.

Key words: Jungheinrich, refurbishment, lithium-ion.

Introduction

The centralised industrial refurbishment is the basis of the used equipment business and ensures that used forklift trucks become Jungheinrich Jungstars, a benchmark for the used forklift trucks industry. The refurbishment has many benefits for the customer and for us (e.g., Blind and Hipp, 2003; Lindahl, Sundin and Östlin, 2006; Lindahl et al., 2006; Helfat et al., 2007; Boșcoianu, Prelipcean and Lupan, 2018; Makaryan, Hoppe and Fortuin, 2022).

The refurbishment of used forklift trucks involves a centralised uniform procedure in six separate steps: incoming inspection on arrival, disassembly, surface work, component refurbishment, assembly and final inspection. Throughout the entire process each step is strictly quality controlled to ensure the highest level of safety and reliability. The cost and benefits of Jungstars are unbeatable, with lower costs and higher customer satisfaction.

Table 1. The steps of the Jungheinrich electric forklift trucks refurbishment process

Steps	Description
Initial inspection on arrival	During the arrival inspection, the condition of the forklift truck is determined All safety components and worn components such as wheels, chains and hoses are always replaced with original spare parts
Disassembly	The arrival inspection is followed by disassembly and thorough cleaning Consumables such as brake fluid, engine oil and hydraulic oil are disposed of in accordance with environmental regulations
Surface work	The truck frame and mast are primed, smoothed and painted Following inspection and any necessary repairs, the overhead guard, steering system, sideshift, tilt cylinders and battery are blasted and repainted
Component refurbishment	Depending on the forklift truck type, the wheels and spring elements are replaced, the pull rods and axles are overhauled and new bearings and bolts are inserted The transmissions and engines are overhauled and wearing parts are changed The masts are disassembled and the hoses and chains are replaced The batteries are refurbished or replaced
Assembly	The frame, mast and any components are put back together and the forklift truck is restored The finished forklift truck is now as good as new
Final inspection	The final inspection is then carried out by means of a functional test with nominal load. Each forklift truck leaves the industrial refurbishment process as a premium-quality Jungheinrich Jungstar with a safety certificate and personal quality promise from the responsible engineer

The SWOT and ESG analysis of Jungheinrich electric forklift trucks refurbishment

We will conduct a SWOT and an ESG analysis (e.g., Gürel and Akkoç, 2011; Gillan, Koch and Starks, 2021). In the SWOT analysis we will highlight the strengths, weaknesses, opportunities and threats of the electric forklift trucks refurbishment business. The strengths are internal positive elements, the weaknesses are internal negative elements, the opportunities are external positive elements and the threats are external negative elements (Table 2). In the ESG analysis we will highlight the environmental, social and corporate governance factors of the electric forklift trucks refurbishment business (Table 3).

Table 2. The SWOT analysis of Jungheinrich electric forklift trucks refurbishment

Strengths	Weaknesses
<p>Opening of a new state-of-the-art factory Premium quality used electric forklift trucks Look like new and are as good as new Own brand – Jungstars The five-star principle:</p> <ul style="list-style-type: none"> - Safety - Technology - Appearance - Reliability - Sustainability <p>The first forklift trucks refurbishment company Complete intralogistics solutions and services Standardised procedure and highest standards Experienced staff the strictest quality controls Replaced safety-relevant components Centralised uniform and total refurbishment Complete disassembly and original spare parts Reduced consumption of energy and materials Cheaper than a new equipment Trade-in for each used machine</p>	<p>Presence of factories in few countries Growth below market potential Not all components are replaced Second-hand equipment Lower quality than new equipment Wears out faster than new equipment Shorter lifetime than new equipment Lower warranty than for a new product The financial services attached involve interest Excessive standardisation creates rigidity Centralisation takes extra time</p>

<p>Test drive in the subsidiary Flexible and personalised financial services Customer focus and customized solutions Active selling and after-sales service 94 percent reuse rate per truck 80 percent CO₂ emissions saved 12 months warranty and maintenance-free 10 days right of return</p>	
Opportunities	Threats
<p>Opening more refurbishment plants Transition from fossil fuels to electricity Transition from lead-acid to lithium-ion batteries Increasing demand for refurbished equipment Limited budget and price-sensitive customers Sustainability concerned customers Low to medium usage times customers Mixed fleet customers High levels of wear and tough use customers Customers working in a single shift Start-ups and small companies Suitable for rental and stand-by solutions Resource-saving and energy-saving policies Minimizing the use of new parts Ensuring the highest quality standards Investment in research and development Cost savings in the context of rising inflation Extend product life cycle by two to three times All new forklift trucks can be refurbished European Green Deal provisions National Recovery and Resilience Plan projects</p>	<p>Coronavirus pandemic Outbreak of war Disruption of supply chains Cheaper competition price with lower quality The competitors offer different levels of quality No complete disassembly from competition Regional workshop refurbishment Increased bureaucracy High initial investment Not suitable for customers working three shifts Limited natural resources Shortage of skilled labour Scarcity of modern industrial services High initial prices of some local suppliers Generalized cost increases Competition from emerging countries</p>

Table 3. The ESG analysis of Jungheinrich electric forklift trucks refurbishment

Environmental
<p>Environmentally conscious customers Saves around 80 percent CO₂ emissions compared to new production Electric forklift trucks emit less CO₂ than diesel-powered forklift trucks Lithium-ion batteries emit less CO₂ than lead-acid batteries Reduced natural resources consumption Limited resources will stimulate refurbishment Environmentally friendly technologies are more expensive Electric transport is the technology of the future The European Green Deal requirements are implemented Contributes to the energy independence of logistics platforms Ensures the transition from fossil fuels to electricity Use of renewable energy and modern green technologies will reduce global warming</p>
Social
<p>Lower costs in an inflationary period caused by the coronavirus pandemic and the war in Ukraine Increasing population health by reducing pollution Unemployment will be generated in the diesel-powered forklift trucks industry Sustainable new jobs will be created in the electric forklift trucks refurbishment industry More jobs to come in the battery and electric charging station industry Bottlenecks in the supply chain will be reduced by increasing the speed of movement of goods Economic growth will increase social cohesion Increased demand for quality products will increase the welfare of the population The use of refurbished equipment leads to lower end-product costs Expanding business in developing countries will help reduce poverty</p>

Corporate governance

The first industrial company which refurbished logistics equipment
 Buy-back facility offered for used forklift trucks
 Multinational organizational culture and German managerial know-how implemented in Romania
 Investment in research and development of new technologies such as lithium-ion batteries
 Equipment refurbishment and long-term use of batteries contribute significantly to sustainability
 Reducing resource consumption through automation of processes
 Purchasing the best materials and access to relatively cheap local resources
 Increased production will lead to economies of scale
 Market research to identify customer needs
 Implementation of the "think global, act local" principle
 Ensuring the highest quality standards through total and centralised refurbishment
 The refurbishment of electric forklift trucks will evolve towards re-refurbishment

An energy efficiency analysis of electric forklift trucks in terms of CO₂ emissions

The Jungheinrich product eco balance considers the CO₂ emissions during the manufacture, production, use and processing/recycling of all products. In addition to the certified Jungheinrich Product Life Cycle Assessment, the calculation is based on a 2017 study by the Swedish Environmental Research Institute with valid information on CO₂ emissions during the manufacture and recycling of lithium-ion cells. The calculation is based on a service life of 10.000 operating hours of a 2,5 tons forklift truck and the current EU electricity mix for calculating CO₂ emissions from electricity generation (e.g., Ogawa et al., 2010; Walter, 2021).

A lithium-ion battery electric vehicle emits 52 percent less CO₂ and a lead-acid battery electric vehicle emits 42 percent less CO₂ in its lifetime compared to a diesel-powered vehicle, despite higher energy consumption in the production of electric vehicles (Table 4; Figure 1). The use of green electricity can further improve the balance of electric vehicles. Lead-acid batteries are almost 100 percent reprocessed and the energy consumption can therefore be estimated as very low. Lithium-ion batteries can be used in a new vehicle or as a stationary storage due to its long service life. In the case of complete dismantling, the study shows a CO₂ value of 15 kg CO₂ / kWh.

Table 4. The CO₂ emissions comparison of the diesel-powered, lead-acid battery and lithium-ion battery forklift trucks with load capacity of 2,5 tons for 10.000 operating hours

CO ₂ emissions for 10.000 operating hours	Diesel-powered forklift truck	Lead-acid battery forklift truck	Lithium-ion battery forklift truck
Forklift truck weight	4.440 kg	2.817 kg	2.817 kg
Conversion factor	1,53 kg CO ₂ / kg	1,53 kg CO ₂ / kg	1,53 kg CO ₂ / kg
Raw materials (Without traction battery)	6,79 tons	4,31 tons	4,31 tons
Battery weight	-	2 x 1.863 kg	-
Energy capacity	-	-	43,2 kWh
Conversion factor	-	1,55 kg CO ₂ / kg	150 kg CO ₂ / kWh
Raw materials (Only traction battery)	-	5,78 tons	6,48 tons
Production / Assembling	0,71 tons	0,18 tons	0,18 tons
Energy consumption	31.000 liters	60.000 kWh	60.000 kWh
Conversion factor	3,177 kg CO ₂ / liter	0,540 kg CO ₂ / kWh	0,540 kg CO ₂ / kWh
Charging factor	-	1,57	1,23
Use phase	98,48 tons	50,87 tons	39,85 tons
Total CO₂	105,98 tons	61,14 tons	50,82 tons
Difference	-	- 42 %	- 52 %

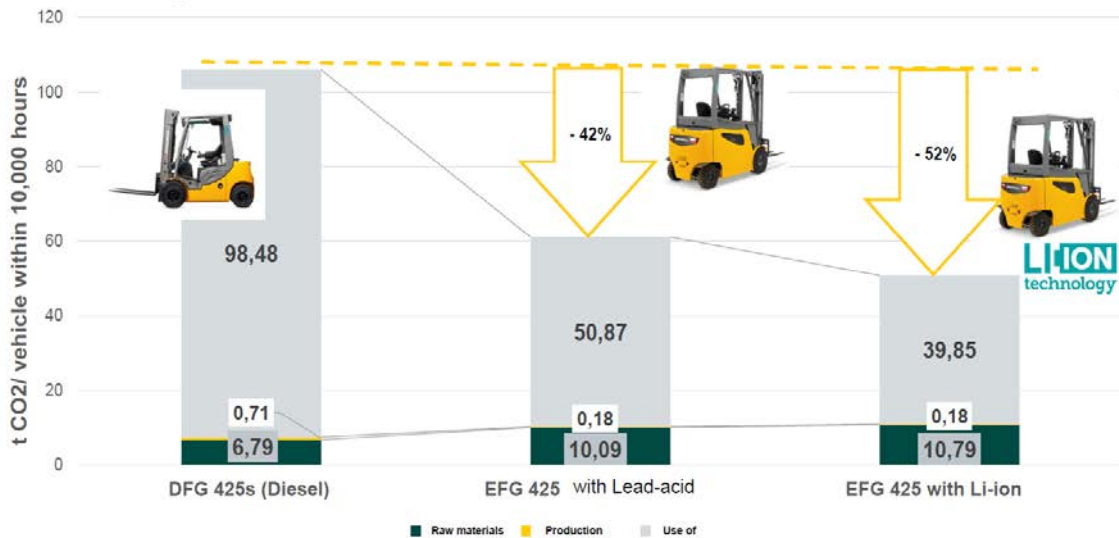


Figure 1. Diesel-powered, lead-acid battery and lithium-ion battery forklift trucks eco-balance

Li-ion batteries are classified as dangerous goods. The disposal route is clearly regulated, the questions of where from and where to are no longer asked in the private sector. Jungheinrich as manufacturer must therefore take back batteries from the customer and is responsible for their correct disposal (Figure 2).

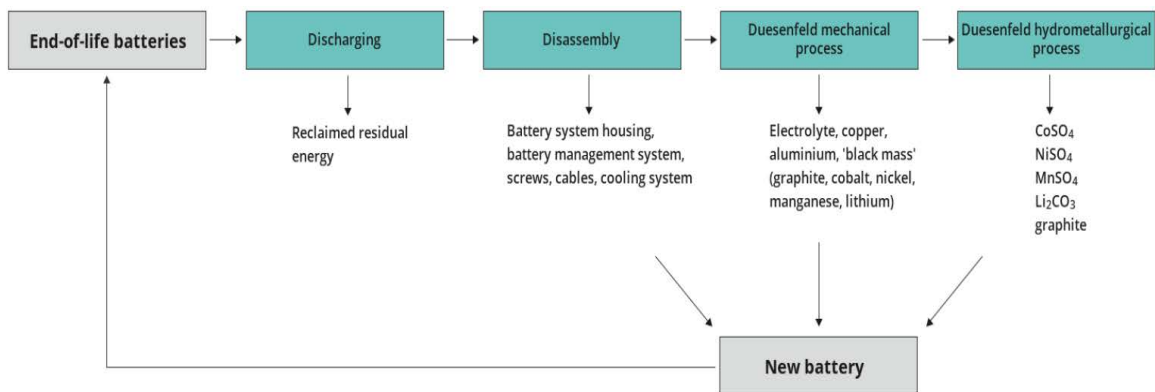


Figure 2. The disposal and recycling of the lithium-ion batteries

Discussion and conclusions

As managerial implications, Jungheinrich is concerned about improving working conditions and ensures that raw materials are not extracted under inhumane conditions by preventing corruption and money laundering, cartel and competition law, data protection and secrecy. Linking own components through software and connectivity increases efficiency and reduces energy consumption of vehicle controls, lithium-ion cells, chargers and battery management systems. The life cycle assessment was certified by the internationally active and recognised service company TÜV Nord. Jungheinrich is the only industrial truck manufacturer to have published a life cycle assessment. It enables Jungheinrich to carry out a CO₂ balance of the vehicle segments. The cell product primarily used at Jungheinrich, the lithium iron phosphate cell chemistry, consists of only 1,4 percent pure lithium.

Lithium is used especially in ceramics and glass, batteries and lubricants. The share of batteries has risen steadily in recent years with 9,5 percent per year, global demand was approximately 34.000 tons in 2013 and 65.000 tons in 2020. In 2013 only 100 Jungheinrich equipment with lithium-ion batteries were sold, 500 in 2015, 6.000 in 2017 and 13.000 in 2018.

Facts about the thesis that there will be no more lithium in 30 years: lithium is a light metal and belongs to the group of alkali metals; share in the earth's crust is 0,006 percent and is slightly rarer than zinc and copper, but slightly more than lead and cobalt; occurrence in minerals, easier extraction; occurrence in brine, more complex extraction. Figures from the US Geological Survey suggest that the world has enormous lithium reserves. At current extraction rates, reserves will last 437 years.

In the lithium extraction is an extremely high consumption of water. The water footprint describes the shares of direct and indirect water consumption of products. The footprint for Germany is 117 billion cubic meters of water per year which means approximately 3.900 litres per day per person. Invisible water load in food and industrial goods: 130 liters of water in one cup of coffee, 3.850 liters of water in a 250 g of steak, 4.100 liters of water in a t-shirt, 8.000 liters of water in a pair of jeans and 7.000 liters of water in a Jungheinrich lithium-ion battery. Lithium-ion batteries have a significantly longer life expectancy than, for example, a pair of jeans or a steak.

The main contributions of this research are related to the importance of the development of the electric forklift trucks refurbishment sector in a post-pandemic period, which helps to reduce resource consumption, extends the life of equipment and offers lower costs for industrial customers, with implications for the final price of consumer goods. The advantages of this research are expressed through the use of lithium-ion battery forklift trucks, which are more energy efficient and offer a 52 percent reduction in CO₂ emissions compared to diesel-powered forklift trucks, due to the lower energy losses within the battery, as opposed to lead-acid batteries, which offer a CO₂ reduction of only 42 percent.

The limitations of this research are related to the fact that the CO₂ emissions analysis methods and results may differ from company to company, the SWOT and ESG analyses represent outdated models and the fact that we did not have access to all internal company documents, some being considered confidential. Future research will focus on expanding electric forklift trucks refurbishment capabilities to other regions and transitioning to lithium-ion batteries, which are sustainable and represent the future of electric forklift trucks evolution.

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THE IMPACT OF CLASSROOM MANAGEMENT ON THE POST-PANDEMIC EDUCATION PROCESS. A CASE STUDY FROM A ROMANIAN PRE-UNIVERSITY SCHOOLS

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Abstract

Purpose – The article aims to examine classroom management in specific traditional learning spaces as one of the disruptive factors of the post-pandemic educational process. This reduces the attraction of educational facilities. Comparing cases from theoretical and technological classrooms will provide more realistic evidence of the phenomenon studied.

Methodology/approach – Based on short reviews of the literature on Romania's pre-university education system and real observations of two different secondary schools, and based on questionnaires, a survey was developed. The main objective is to provide information, opinions, and figures on the role of classroom management in post-pandemic education.

Findings - Respondents were satisfied with physical learning spaces, ambient environments, furniture, lighting, air, and sound quality. Teachers and students used technology and devices under appropriate conditions. Ergonomics can be a solution to improving work and learning conditions.

Research limitations/implications – The research sample consists of 66 respondents from two classes of two branches: one technological and one theoretical, in Romania.

Practical implications - School managers, local and national policy makers must develop visions that integrate space, technology, and education quality standards. Teachers' health and safety at work should be more emphasized. STEM education should be better supported with modern didactic materials.

Originality/value – This research approach has been designed and applied in an innovative way, as no other similar study has been identified in the literature.

Key words: Pre-university education, learning space, STEM education.

Introduction

In 1925, the Minister of Public Instruction, Constantin Angelescu, decided to create in Romania a new method of examination called the Baccalaureate. His entire activity went in three directions: unification of the education system, building new schools, and raising the status of the teaching staff (Panaitescu, 1928; Petrica, 2010). Since then, the Romanian education system has followed different strategic plans and recently aligned with the standards of education in the European system. Thus, in almost 100 years, it seems that the Romanian education system has suffered a dynamic transformation, being, in the last two years, affected by the Covid-19 pandemic crisis, which has accelerated the digital transformations of all processes. Students and teachers experienced uncertainty and stressful situations; communication and feedback during the education process were negatively affected, and some pupils, students lost their connection with the group of learners, with schools, colleges or universities. The main cause of this phenomenon was a lack of digital competence in teachers and students, accompanied by the lack of methods (including teacher methods) and tools (with reference to equipment and software) for online learning (lack of organization of new methods of evaluation of teaching and learning).

Additionally, the labor market has been affected in the last two years. The way of work has evolved (online, work-from-home, hybrid, etc.), the expectations of employees and employers have changed,

and the number of jobs available has been different distributed by industries. Two years ago, candidates complained that there were not enough jobs. Now, employers complain about the lack of candidates. Although the dynamics of the labor market depends on industry, the services sector is the most affected and the production and transportation sectors are fewer.

In Romania, according to official statistical data provided by the National Trade Register Office (ONRC), regarding companies with foreign capital participation (<https://www.onrc.ro/index.php/ro/statistici?id=254>), the National Institute of Statistics (INS), regarding the average number of employees by counties, (<http://statistici.insse.ro:8077/tempo-online/#/pages/tables/insse-table>), and the National Bank of Romania (BNR), regarding Foreign Direct Investment (FDI) (<https://www.bnr.ro/PublicationDocuments.aspx?icid=14364>), and the synthesis in Table 1, in the current economic environment, FDI and labor migration directly affect the reduction in workforce (see county relationships). The trends of the three indicators allow us to observe discrepancies between Romanian counties that determine the richness and poverty of the development region.

Table 1. Romania's 2020 statistics (BNR, ONRC, INS, 2022)

County	FDI balance Million Euro (BNR, 2022)	Total turnover Billion Lei (ONRC, 2022)	Average number of employees (INS, 2022)
Bucharest	48,713	637	1,133,007
Ilfov	5,876	121	187,011
Timis	4,579	74	198,914
Brasov	2,668	53	146,464
Prahova	2,579	60	142,238
Cluj	2,101	72	202,031
Mureş	1,884	35	93,398
Sibiu	1,820	38	108,64
Constanta	1,804	48	127,727
Arges	1,521	61	134,542
Dolj	1,334	38	93,892
Arad	1,103	31	84,333
Alba	1,024	28	63,096
Bihor	1,023	39	120,133
Olt	904	16	43,636
Maramures	710	20	78,102
Galaţi	708	27	75,648
Satu Mare	570	20	58,431
Iasi	515	32	111,854
Hunedoara	456	13	60,445
Buzau	451	19	54,207
Salaj	451	8	28,752
Dambovita	442	17	51,288
Suceava	420	22	70,075
Giurgiu	363	8	26,657
Ialomita	333	9	25,197
Bacău	329	32	82,652
Calarasi	299	8	25,386
Tulcea	295	9	29,314
Covasna	283	7	26,677
Harghita	223	12	48,305
Caras-Severin	216	6	30,097

Braila	199	9	37,073
Neamt	193	13	48,101
Valcea	183	13	49,730
Bistrita-Nasaud	123	13	47,658
Vrancea	120	10	37,243
Teleorman	117	7	27,523
Botosani	74	8	30,327
Vaslui	58	7	30,490
Mehedinti	14	4	16,867
Gorj	5	8	45,277

For the first quarter of 2022 (Eurostat Statistics Explained, 2022), the employment rate of the working-age population, between 20 and 64 years, was 74.5 percent, showing the labor market volatility. However, after lifting Covid-19 restrictions, the appearances of the Ukrainian war, the global disruptions in supply chains that have led to inflation acceleration, candidates' manifest cautiousness in job searches. The "chase for employees" is the new phenomenon on the labor market. During and after the pandemic crisis, many studies described these problems (Demyen and Ciurea, 2018; Radu, 2018; Russu, 2018; Russu, 2019; Taicu, 2019; Maita, Padurean, and Apostol, 2021; Plesca et al., 2021).

During the period of the Pandemic Crisis, it has been observed that pre-education systems most commonly use old classroom learning spaces, which sometimes pose a risk to both teachers and learners; learning motivation of students is negatively affected. These facts and phenomena were discovered through observation and intense discussions among teachers after returning to the face-to-face education style. Thus, teaching staff complained that learning spaces are stressful (Marin, 2022). Other risks have been identified as those associated with online and/or hybrid teaching conditions, such as technical problems, symptoms of depression, and burnout. In 2021, teachers reported much higher levels of stress and symptoms related to their work than the general population (Schipor and Duca, 2021; Alexescu et al., 2022; Ciuhan, Nicolau and Iliescu, 2022).

Consequently, the 2021 National Report on Pre-university Education published by the Romanian Ministry of Education showed that of the total 2,500,000 schoolchildren, more than 285,000 (aged between 7 and 17 years old) were out of school, of which more than 20,000 from the primary and secondary school system, and about 14,000 high school students. In the last three years of high school education, the dropout rate was a constant value (2.5 percent).

In this complex and dynamic context, the present article aims to examine classroom management in specific traditional learning spaces as one of the disruptive factors of the post-pandemic educational process, which reduces the attractiveness of the educational process locations. Comparisons between the branches of the theoretical and technological schools provide solid arguments on the phenomena studied.

Methodology

Based on a brief literature review related to the pre-university education system in Romania, and real-life observations in two different high schools, have been built an applicative research methodology using a survey based on a questionnaire. The main objective was to provide insights, opinions and figures about the role played by the classroom management in the post-pandemic education process. According to Oxford Bibliography: "Classroom management can be defined as the actions teachers take to establish and sustain an environment that fosters students' academic achievement as well as their social, emotional, and moral growth". The general goal in this case is to rich balance for a type of order that facilitate the learning, communication, interaction processes related to the education process¹. Classroom management uses different methods and tools (including software and hardware) that facilitate the learning process and knowledge acquisition (to support a student-centered approach). In this context, the learning space, together with all visual representations, displays, or other learning tools

¹ Retrieved from: <https://www.oxfordbibliographies.com/view/document/obo-9780199756810/obo-9780199756810-0155.xml> (Access 29-07-2022)

(schema, circuits, figures, drawings, pictures), could facilitate or inhibit the creative processes associated with learning.

Considering this second directive of the 1919 document "Goals of the Minister of Instruction" (available at the Romanian Academy Library), on school buildings and their construction, and the present learning spaces, we created a survey to characterize the relationship between learning spaces (buildings and physical resources) and the learning process. The survey has been applied in the case of two classes of pre-university system: one from a theoretical branch classroom and one from the technological branch (both high schools were from the West Development Region of Romania). Table 2 shows the use of the questionnaire for research.

Table 2. Questionnaire for examining and evaluating the use of learning spaces

Each school needs visions and developmental strategies that are essentially designed to determine the relationship between these concepts: the development of buildings and physical resources, as well as learning. Schools must develop visions that combine space, technology, and education. Sustainable development must also continue.

Although there are not enough facilities in all classrooms, communicating and sharing your vision with school staff is important to provide everyone with the opportunity to look at how to improve education and learning.

Schools recognize that classrooms should not be static. Modern furniture allows one to adapt the classroom to learn activities. Schools must consider the reuse of furniture in new designs. The two main points to be considered are technology and the teaching approach of teachers and students. Virtual spaces are not merely physical classrooms.

The following questions will help explore and determine how to use learning spaces, and the following lists will serve as a starting point for each space.

1. Does the space have different learning themes?
 2. Is there enough room to accommodate?
 3. Can the space be used during the lesson?
 4. Can the space be used before and after the lesson?
 5. Is the furniture flexible and mobile?
 6. Is the lighting adjustable and adequate for teaching and learning?
 7. Is the acoustic suitable for the activities carried out?
 8. Is the air quality adequate for the activities carried out?
 9. Is the space accessible?
 10. Does the teacher move regularly around the perimeter of the classroom / space?
 11. Do students travel through the classroom during the lesson to perform various tasks?
 12. Does the teacher prepare various tasks for different students?
 13. Do students produce the same learning outcomes?
 14. Students are expected to complete tasks based on technology, before the class?
 15. Do students use technology during lessons?
 16. Can students use their own devices during the lesson?
 17. Does the teacher use technology during the lesson?
 18. The program gives students the flexibility to decide when and where to study.
 19. Is the space occupied daily?
 20. Please express your opinion on this possible "ergonomic class of the future"
- (Figure 1)



Figure 1. Question 20. The case of the possible "ergonomic class of the future"

The results achieved from the survey have been interpreted based on informal discussions with learners and practical observations in the two classes (Figures 2a, 2b, 2c, 2d, 3a, 3b, 3c). Furthermore, to better understand the results, a brief analysis was developed with the high school directors and additional modern ergonomic learning space solutions were considered.

Results

Of the total of 66 responses, 21 were from teachers/managers and 45 from learners. Students in the technological branch of the high schools were forestry, environmental protection and mechanics, and those from the high school were vocational, theological. The passing rate of the baccalaureate exam for the period 2018 - 2020 of the theoretical high school is 100 percent, and for the one of technological branch, it does not exceed 50 percent for the same period.

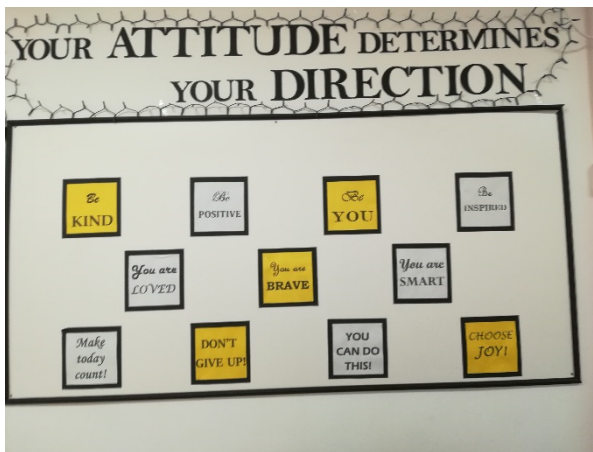
Only the theoretical high school has been energetically rehabilitated in 2020. Questions about the physical learning space, the ambient environment, respectively, the furnishing, lighting, air quality and acoustics, and movement of the participants to the lessons inside the space received positive responses, 46 to 55 percent of respondents agree on 'good' and 'very good' conditions in their classes. Regarding the technology and devices used by both teachers and students during lessons, 38 to 42 percent of the respondents agreed on adequate conditions.

However, in the case of Question 13 (see Table 2) related to the learning outcomes different opinions have been collected: 6.08 percent totally disagree; 33.33 percent disagree; 31.81 percent neither agree/disagree; 25.75 percent agree; 3.03 percent totally agree. These results should be interpreted with the answers to question 20, related to users' opinions of the users about the ergonomic class solution (Figure 1). We draw attention to the following responses (only the third is from the theoretical branch of high school):

1. "With involvement and respect for the actors on the education scene, it could also be possible here. Flexibility, mobility, and modernity are the keys to success. The atmosphere changes, communication barriers and blockages disappear in such a classroom.
2. It is a room where students would probably like to come to the respective school and besides that they would learn much more than they usually do.
3. It seems to me to be a friendly, well-equipped, and arranged environment where you can come with love.
4. I think this class would be useful for students to relax during school.
5. It looks incredible, it would be great if we had a class like that, but with the education system and the allocated budget, we dreamed of something for nothing.



a. General view of the classroom



b. Posters on the classroom's wall



c. Motivational poster



d. The front of the classroom - the teachers' view

Figure 2. The case of the classroom from the theoretical branch.



a. General view of the classroom with didactic materials on the walls, since 1984



b. Didactic material - Schema of a circuit from 1984



c. Didactic material - Engine from 1984

Figure 3. The case of the classroom from the technologic branch.

6. It is a step forward, but the system problem comes from teachers with airs of superiority and bored with life, and such a teacher has no business in the department.
7. Well calibrated, it offers optimal positioning of students for constructive interaction. Provides physical and emotional comfort”.

Furthermore, the teachers' responses that were most relevant to the study results are:

1. “The classroom has mobile furniture that favors the arrangement of various activities, has modern technical means, the only improvement would be natural lighting and the existence of a more generous space, which would allow for the free movement of students and teaching staff.

2. I prefer a quieter space with a theme area and a relaxation/break area. The space in the picture looks suffocating. I would keep the equipment: video projector, resources. I prefer the flexibility of the furniture positioning if needed, for example, I prefer the U shape.
3. I think this room is ergonomic from all points of view, and the arrangement is designed not only for classroom use, but also as a multimedia room, a conference room or even offices”.

Discussions and Conclusions

The schools / high schools of the preuniversity system should be the main targets of the Romanian municipality’s renovation strategies, and their energy rehabilitation should be a national priority. They have a long-term impact on social development, including financial, environmental, and on the health and education performance of teaching staff and learners (children, students).

To involve students in authentic and meaningful learning situations, including design, implementation, testing, reflection, and documentation, there is also a strong need to equip the learning spaces with adequate visual and didactic materials related to the specialty (theoretical or technological branches).

Special attention should be paid to STEM (Science, Technology, Engineering, and Mathematics), which needs modern didactical and pedagogical materials and tools. These fields are of great interest to children and students. In addition, experts, local stakeholders, and representatives of the labor market can support a wide range of educational topics.

Moving to the implementation phase is more difficult and not risk-free. The success of education is not only associated with identifying and satisfying learning needs. However, it is necessary to form a multidisciplinary team to lay the foundations for innovation in STEM education. School managers should also collect data on the working conditions of teachers and the conditions of health and safety at work. Policy makers, local and national stakeholders should work together to develop a clear policy on blended/online education based on clear and comprehensive technical standards.

Notes

The photos were taken with the consent of all participants involved in completing the survey questionnaire.

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ASPECTS REGARDING THE POSSIBILITIES OF INCREASING THE QUALITY AND MANAGEMENT OF THE EDUCATIONAL SYSTEM IN ROMANIA IN THE POST-PANDEMIC PERIOD

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Abstract

Purpose – This article aims to present some aspects regarding the possibilities of increasing the quality of the educational system.

Methodology/approach - The methodology adopted consists in identifying methods of analysis and quantification of the possible quality to be applied in an educational system at any level (primary, secondary, pre-university, university and post-university).

Findings – Among these methods, Quality Function Deployment (QFD), break-even method (or critical point method, or dead center, or Break-Even) are presented and analyzed.

Research limitations/implications – The limitations of the research carried out and implicitly, the future research directions consist in finding concrete ways of applying the methods of analysis and quantification of the quality and management of the educational system in Romania in the post-pandemic period. Furthermore, the latest research aims at identifying a set of new methods meant to quantify the quality of the management of the educational system.

Practical implications – The importance of the specificity of the organizational culture (the pre-existing cultural elements at the beginning of the process, the flexibility to bring new values and quality specific norms) was highlighted for the efficiency of the quality of an educational system.

Originality/value – The originality of this article consists in identifying the possibilities of using methods and techniques to increase quality in an educational system.

Key words: management, quality, educational system.

Introduction

The new requirements that foreshadow the future of quality also imply organizational changes through the development of a quality-oriented organizational culture. These changes must be planned, participatory and negotiated (Luta and Ioana, 2021)

The implementation of a quality management system and implicitly its audit are directly conditioned by the specifics of the organizational culture, by the pre-existing cultural elements at the beginning of the process, by the flexibility to bring new values and norms specific to quality.

Having a quality system in the organization is a proof of an efficient management, of a management oriented towards cultural values that implies quality as a fundamental factor of progress. Quality culture is a system of values that exists in an organizational environment that is oriented towards maintaining and continuously improving quality.

The common characteristics of organizations with a favorable climate for quality culture are:

- employees are equally involved and authorized;

- the team is at the core of the activity: managers are equally employed and involved; no responsibility is delegated.

Sufficient resources are allocated, where and when needed, to ensure continuous quality improvement;

- the promotion system and rewards encourage the contribution to continuous quality improvement;
- feedback from customers is actively taken in order to continuously improve quality;
- suppliers and customers are treated as partners;
- there is a value system based on high performance standards for management and human resources, for products / services made;
- communicates continuously, openly;
- continuous evaluation and improvement is practiced

The characteristics of an organization with an unfavorable climate for quality culture are:

- the hostile environment determined by the usual managers to give orders from an isolated position makes it impossible to move towards total quality;
- there are fluctuations of the management members;
- the transition to total quality takes time;
- most of the actions started or of the declared ideas are abandoned;
- employees are not open to the idea of internal partnership based on mutual support and teamwork;
- there is no communication, transparency, receptivity;
- there is no concern for quality and satisfaction of customer requirements

Strategic quality management (MSC) is the new culture at the highest levels of the organization. Its introduction requires initiative and change from senior managers and personal involvement.

Quality is addressed to the people of the organization both as a whole and individually. It involves taking responsibility and total quality management - TQM (Total Quality Management). TQM involves change management (Luta et al, 2021).

The term "Total Quality Management" is used (in English) by almost all specialists and usually means total quality management. Taken in a broader and deeper sense, it also means "total quality management" or "total quality in the management process". In another interpretation it would mean the integration of quality in the different spheres of the management process, ie in finance, sales, marketing, distribution, human resources management, production, public relations, services, etc.

The purpose of managerial activities is to find ways to lead so that the result is a quality product. TQM aims to achieve long-term success by customer satisfaction, based on the participation of all members of the organization in the process of improving technologies, products and services and the organizational climate in which they operate. TQM was used to describe the Japanese style of management, applied to improve quality; the international market has led companies around the world to adopt TQM.

Methods of study, analysis and quantification of quality applicable in the educational system

Studies on the quality of education such as the IEA (Education Assessment Indicators) and international surveys conducted by the OECD (PISA surveys), UNESCO (Education for All) or the European Union (research undertaken by its specialized agencies: Eurostat, Eurydice, ETF and Cedefop) support the use of indicators to meet the requirements of:

- quality assurance in education;
- measuring school progress;
- comparison with the help of common strategies (indicators and reference standards);

In order to identify the problems to be solved, the structuring of ideas and the identification of possible solutions, along with classical techniques and tools, modern tools have been taken from the sphere of management or marketing. They are applied for three main purposes (Luta et al, 2021):

- identifying the important problems to be solved and their causes: the relationship diagram and the tree diagram;
- establishing solutions for solving problems: matrix diagram and tree diagram;
- determining the concrete program meant to solve the problems: PERT diagram and decision diagram.

A method used in planning the quality of products and services: Quality Function Deployment (QFD) aims to eliminate possible errors that may occur throughout the process, even before designing a new product or service.

This method meets customer requirements and gives the manufacturer or service provider the opportunity to design this market-oriented product or service. QFD meets the requirements of customers, the entire approach is based on information obtained from customers, in support of product design (by product we mean possible services provided) based on customer needs. The method is complex and has been developed to maximize customer satisfaction through various techniques and methods.

The QFD method takes into account both expressed and unexpressed customer wishes, translating customer requirements into product features. QFD focuses on providing added value. The customer has the opportunity to express different degrees of importance, or utility, that he would like the product or service to include. This is especially important because an enterprise, or institution, must provide a product that is in demand by the market. The working process of the method is complex, starting with the identification of customer requirements, the last phase of the process being product design (Ioana, 2016).

The modern methods of quality management that are used prior to QFD analysis are the affinity diagram, Gemba, the Kano model and Voice of the customer. The mentioned techniques aim at identifying the clients' requirements, so that they can be integrated in the design process, or adapting the product / service to the market requirements. The QFD method allows the identification of possible future directions of action and the integration of the above mentioned instruments.

The QFD method was developed by the Japanese Yoji Akao. It defines QFD as "a method for developing a design quality aimed at satisfying the consumer and then translating the consumer's demands into design targets and major quality assurance points to be used throughout the production stage".

- For a service, the definition of a QFD could be formulated as follows: "a system and procedures that help plan and develop services and ensure that they meet or exceed customer expectations."
- The purpose of the QFD method can be expressed as follows:
- Quality, by the fact that the client's wishes are transferred to the final product;
- Function, by the fact that all organizational units work together;
- Deployment, to define in more precise units all the necessary activities, which must be measured and controlled.

The QFD method was first applied in 1974 to Toyota in Japan. Quality specialists Makabe (Japan) and D. Clausing (USA) have developed a simplified method called "House of Quality" which consists of a graphical support consisting of six matrices (Luta et al, 2021):

- matrix of customer requirements;
- matrix of technical characteristics;
- connection matrix;
- correlation matrix;
- technical evaluation matrix;
- customer satisfaction assessment matrix.

The method can be adapted depending on the approach of the research and the expected result, there is the possibility of integrating in the analysis all the matrices, or only some of them.

If several QFD analyzes are performed in parallel, a concatenated analysis of all QFD analyzes can be performed, through statistical calculation programs. If there are conflicts in the QFD analysis, in order to resolve them, the TRIZ method (Theory of inventive problem solving) can still be applied. In the development of a product / service there is a need to determine the customer's requirements in order to integrate them properly in the design of the product / service. Determining the customer's requirements in designing a product / service is crucial.

The methods of sampling the client's requirements are:

- Application of a pre-defined questionnaire (Gemba worksheets); the method has the disadvantage that that client could be influenced by the pre-defined criteria in making decisions.
- Offering the possibility for that customer to define for himself the characteristics of the product he would be interested in; the disadvantage of the method refers to the obtaining of results irrelevant for the undertaken research.

To complete the work steps, a special diagram called "House of Quality" is used as a graphic support for this method. In figure 1 we present the structure of the quality house.

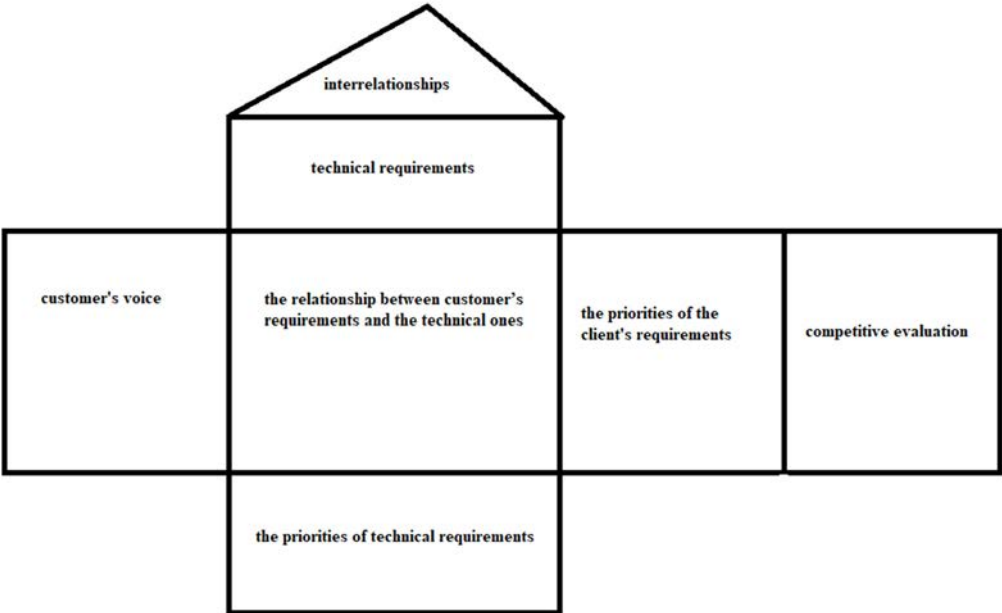


Figure 1. The structure of the quality house

The quality house consists of six matrices: the matrix of customer requirements, the matrix of technical characteristics, the matrix of connection, the matrix of correlation, the matrix of technical evaluation and the matrix of evaluation from a market point of view.

In applying the method it turned out that the most difficult thing is to complete the matrix of customer requirements, because it requires a large amount of data and information, which come from different sources. The requirements of the clients related to the product / service of the enterprise are registered within this matrix as well as the degree of importance given to them by the client (Ioana et al, 2021).

The matrix of technical characteristics contains the requirements of the manufacturer / provider of products and services, more precisely it contains the characteristics of the product / service that must be provided by him in order for the product to meet the requirements of the customer.

The connection matrix forms the central area of the diagram within which the connection between the customer's requirements and the technical characteristics of the product / service is highlighted. Within this matrix, the customer's requirements are practically "translated" into technical characteristics of the

product / service. This matrix represents the central area of the diagram, because non-conformities can be identified within it, before the product / service is designed.

The correlation matrix is located at the top of the diagram, which shows the interaction between the technical characteristics. If these interactions are identified in a timely manner, the product / service provider can save a significant amount of resources during product planning. These interactions, or correlations, can be positive (+), or negative (-), but other scales are possible, such as: strongly positive, positive, negative, strongly negative, neutral, etc.

The evaluation matrix of the product / service in relation to the market and its requirements is positioned on the right side of the diagram. In order to complete this matrix, a market research is needed. The importance of each requirement and possible suggestions for improvement can also be established.

The product / service evaluation matrix from a technical point of view is located at the bottom of the diagram. It establishes the importance of each technical feature in meeting customer requirements.

Another method of analysis and quantification of quality possible to be applied in the educational system is the method of profitability threshold (or the method of critical point, or dead center, or Break-Even).

The break-even method is an important method in the analysis of product profitability and profitability on the whole activity, both in the phase of designing new productive capacities, of forecasting the activity, and of analyzing the use of existing production capacities. Figure 2 shows the graphical representation of the break-even method (Ioana et al, 2019).

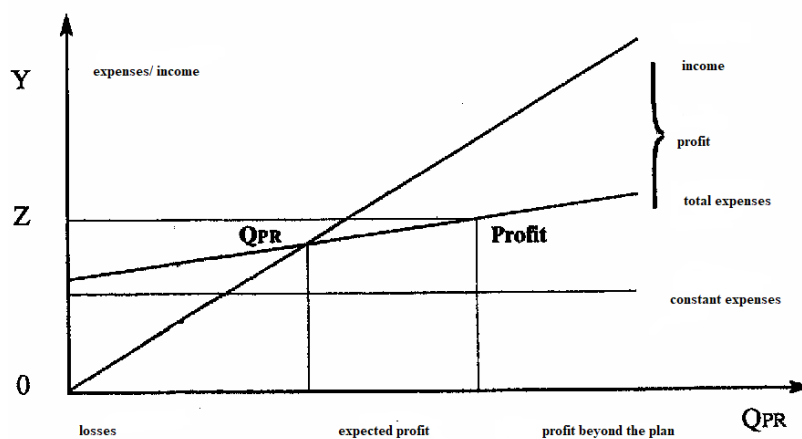


Figure 2. The graphical representation of the break-even method

Particular attention must be paid to the situation in the "profit above plan" area (profit area above expected) because the situation in this area for an extended period can lead to negative economic mechanisms (inflation, overproduction, etc.).

Discussion and conclusions

The analysis and quantification of the educational system quality at any level (primary, gymnasium, pre-university, university, postgraduate) has a special importance for identifying the ways and methods of increasing the quality specific to this field.

The specificity of organizational culture (pre-existing cultural elements at the beginning of the process, the flexibility to bring new values and quality-specific norms) is very important for streamlining the quality of an educational system.

One possible method to use to increase the quality of an educational system is Quality Function Deployment (QFD). This method aims to eliminate possible errors that may occur throughout the process, even before designing a new product or service.

Also, the use of the break-even method (or the critical point method, or the break-even method, or Break-Even) can lead to the efficiency of the quality of an educational system. The analysis through economic and managerial mechanisms of the situation in one of the 3 distinct areas of the method (area of losses, area of expected profit, area of profit over expected) allows the identification of the most efficient methods to increase the quality of the educational system.

Not only will future research in this field aim at finding concrete ways of applying the methods of analysis and quantification of the quality and management of the educational system in Romania in the post-pandemic period, but also at developing new methods of quantifying the management quality of the educational system.

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CHALLENGES AND TRENDS SHAPING THE POST-PANDEMIC AUTOMOTIVE INDUSTRY

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Abstract

Purpose – This work aims to identify emerging challenges and opportunities of the automotive sector as a result of the COVID-19 outbreak. With shortages starting to arise even before the pandemic, the automotive industry was one of the most affected during the pandemic. OEMs and suppliers must not overcome these challenges and grasp new opportunities to satisfy the new demands of their customers.

Methodology/approach – In order to understand the development of challenges from the pre-pandemic industry to the post-pandemic one, financial and industry related reports published by major consulting entities have been gathered and reviewed. Major challenges and opportunities have been selected and further highlighted throughout the conduct of this paper.

Findings – If the automotive chip shortage and sudden drop of vehicle orders are a clear sign of a struggling industry during the COVID-19 pandemic, the rapidly changing behavior of the road users is now the hardest to satisfy. Switching from conventional vehicle ownership to subscription services, customers are now asking for more transparency and started searching for easier process while acquiring a vehicle. On the other hand, the rapidly evolving technology of the automotive industry and a vehicle's connected interfaces, cybersecurity becomes a concern of the industry that needs to be addressed.

Research limitations – The uncertainty of the actual pandemic evolution is affecting the accuracy of the conducted study as the predictions might anytime be obsolete. However, reports conducted throughout the whole pandemic development have been analyzed and the combined predictions are presented in this work.

Originality/value – This paper analyses numerous reports released by well-established consultancy firms, bringing together prediction published in the last three years. Therefore, a complete overview of the challenges evolution through the pandemic as well as a stable vision for 2030 are presented.

Key words: automotive, management, challenges

Introduction

Everyday life came to a complete stop in several countries around the globe as the COVID-19 outbreak has been declared a pandemic. This event has caused several automotive businesses to close or scale back operations, this leading to severe economic impact for the industry [Hausler et al. (2020)]. With long lasting negative impact on the mobility, the already hardly the automotive OEMs and suppliers are now struggling with changing customer demand and more complex cybersecurity attack. However, industrial challenges, changes in customer demands and their inquisitiveness towards new trends may vary from one region to another [Vitale et al. (2020)]. Now, OEMs must persuade their consumers back to the new vehicle market even if the interest in conventional vehicle ownership has fallen throughout the years [Vitale et al. (2020)]. New services must now be implemented as it is foreseen that services will account for 30% of the total revenues of OEMs by 2030 [Accenture (202)]. Therefore, choosing the correct services to offer and allocating the necessary development resources, are key factors in determining the future market leaders of the automotive industry. With so many emerging trends, the automotive industry faces as many challenges as opportunities. During the conduct of this paper, a few of these are to be further addressed. Recently emerged topics of the automotive industry such as customer behavior changes and cybersecurity vulnerabilities are described. Moreover, the well-known shortage of vehicle semiconductors together with an industry's forecast for 2030 are topics highlighted throughout the paper.

Vehicle subscription services

To diversify their revenue streams, car manufacturers have been seeking for alternative business models for a long time already. While car sharing, ride hailing, and other transportation services, have grown in popularity, there have only been two real alternatives to traditional vehicle ownership: short-term rental or leasing. Both services are either not cheap for the consumer, impose long-term commitments or enforce restrictive terms. It was only a matter of time until OEMs and other major players of the automotive industry would have introduced subscription services. In addition, numerous startups have joined the game in Europe where the market has been proven to bring the biggest revenues. Therefore, the vehicle subscriptions market could potentially grow into a \$30 billion to \$40 billion market during the next decade [Schellong et al. (2021)].

Public transport and shared mobility have been brought suddenly to a near halt, with consumers looking for alternative, safer methods of travel. Seeking the safety of private vehicles, consumers began to be more interested in purchasing or in having available a private method of travel. Being asked if the pandemic had an impact on their decision of acquiring a vehicle in order to avoid public transport, 44% of the Romanian responders have answered affirmatively. On the other hand, the same study conducted by Deloitte shows that less than 20% of the Austrian and Belgian responders have the same opinion [Proff et al. (2022)]. The pandemic, however, is not the only key driver in changing the desire of consumers of having an own vehicle. The tedious car buying process, residual value loss and lack of price transparency are the main reasons why consumers are gaining interest in vehicle subscription services [Schellong et al. (2021)]. Consumers regard subscription services as being more accessible and less risky than the tradition vehicle ownership. With higher prices of vehicle purchases caused by component shortage and increase in cost of raw materials, subscription services will grow in popularity. New companies emerge on the market with attractive Battery Electric Vehicles (BEVs) having numerous features but without having a brand history behind such as other big, well-established OEMs. With subscription services now available, consumers are more willing in trying these vehicles as these services are mitigation one's ownerships risks such as high battery replacement costs which can cost up to \$16,000 [Schellong et al. (2021)].

Subscription services are not foreseen to overtake the traditional car ownership anytime soon. As Netflix did not overtake Universal Studios, nor did Spotify catch up with Warner Bros., vehicle subscriptions are expected to only gain a certain pool of customers [Schellong et al. (2021)]. However, starting with 2022, it can be clearly seen that more and more consumers are willing to use services like short-term leasing and subscription models because they began to revalue having a continual access to a private vehicle. [Heineke et al. (2021)]. Slowly, more consumers will be more opened to switching from a traditionally owned vehicle to a shared mobility service. Even if such services are nowadays a small niche of the automotive industry, as previously stated, the market growth is expected to reach high levels in the upcoming decade [Heineke et al. (2020)].

Auto-semiconductor shortage

It can be clearly stated that the semiconductor shortage has not been caused by a single occurrence or disruption, but by a series of related incidents. Being affected by the COVID-19 outbreak, the automotive industry has felt a massive drop in vehicle orders even since the beginning of the pandemic [Burkacky et al. (2021)]. However, the semiconductor shortage began to create difficulties in other various industries too when manufacturing lines of electronics have been slowed down. Even so, the effects in the automotive industry have been more severe than in the electronics one [Burkacky et al. (2022)]. This crisis has rapidly demonstrated the weakness of the semiconductors supply chain that was heavily depending on the only major semiconductor production center, Asia. OEMs and their suppliers are currently operating in a crisis mode, being now forced to address the imbalance in demand [Burkacky et al. (2021)].

With a 179% increase in semiconductor manufacturing capacity since 2000 and a roughly 4% annual increase, the semiconductor manufacturers are not coping with the high demand requested by the automotive industry. This demand is strongly underlined by the semiconductor utilization over 80% in the last decade. Having the utilization in 2020 at almost 90% can be easily regarded as full utilization, further affecting the lead timed in the automotive industry [Burkacky et al. (2021)]. On the other hand, the geopolitical tensions are now causing further disruption even in a post-pandemic word. This uncertainty has led some electronic manufacturers to significantly expand their chip inventories in order to survive a possible next semiconductor shortage. These geopolitical uncertainties have been added

on top of the already existing crisis because Russia provides more than 30% of the global need of palladium while Ukraine provides more than 40% of the global semiconductor-grade [Burkacky et al. (2022)]. Another issue is strongly related to logistics, as the big majority of semiconductors are transported by air, where shipping rates have climbed dramatically to new records. At the same time, the air transport capacity has also dropped. All industries still face a major gap between their demand and the actual chip supply, even after two years since the beginning of the chip shortage crisis. Sales in all industries have recovered faster and with higher volumes than anticipated by experts during the pandemic. This creating further drawbacks in the supply chain [Burkacky et al. (2022)]. Consumer demand has also switched during the COVID-19 outbreak, focusing on high-tech devices highly needed in a home office layout. Routers, modems, laptops, and PC manufacturing demand rapidly increased therefore more semiconductors were needed. Therefore, vehicle manufacturers and their supplier are facing yet another challenge, competition in semiconductors with other sectors. This challenge has highlighted the need of reducing the industry's dependency of Asian suppliers.

Cybersecurity challenges

Cutting edge technologies of the automotive industry such as autonomous driving are a vulnerable target of cybersecurity attacks. The related 5G technology which allows connected driving is transforming modern vehicles in information hubs as large amount of data must be transferred in order for these technologies to function. The lack of cybersecurity requirements in the automotive industry and during the product development process, has demonstrated that connected vehicles are an easy target for black hat hackers [Brown et al. (2021)]. Therefore, new regulations, standards and frameworks focusing on the cybersecurity aspect of the automotive industry have been recently published or are under development. With WP.29 regulation developed by the World Forum for Harmonization of Vehicle Regulation already published, more than 60 automotive markets are requiring evidence of cybersecurity practices in the rigorous type-approval process [Heineke et al. (2021)]. Being now obliged to integrate cybersecurity in their internal processes, OEMs and their suppliers will be able to respond in a timely manner to various cybersecurity incidents. The WP.29 regulation consists of R155 and R156, where R155 imposes the development of a Cybersecurity Management system while R156 addresses the post-manufacturing aspect of the software together with the OTA update procedures [Levy (2022)]. Supporting the two previously mentioned regulations, ISO/SAE 21434 provides a methodology for OEM and their suppliers for calculating the risk score of an identified asset and therefore to classify and prioritize based on vulnerability analysis. A new acronym has rapidly gained importance in the automotive industry, TARA. The threat analysis and risk management is defined by the released standards and aids manufacturers to assess how much a road user might be impacted by a possible vulnerabilities. This risk and threat evaluation must be conducted throughout the whole lifecycle of a vehicle [Levy (2022)].

Cybersecurity is regarded as a continuously developing challenge as the number of global connected vehicles will grow from 330 million units in 2018 to 775 million units in 2023 [Levy (2022)]. At the same time, when compared to 2018, an increase of 225% in the cybersecurity incident numbers can be seen in 2021 [Levy (2022)]. Not only the number of attacks has risen during the years but also the complexity of the attacks and the attack vectors. The automotive industry, as well as municipal authorities, faced challenges in 2021 due to the complex and sophisticated cybersecurity attacks. They tried to identify cybersecurity solutions against all current and future attack vectors. It is yet unclear whether newly published standards and regulations will limit the black-hat hackers or encourage them to create more complex attack techniques. Also in 2021, black-hat hackers accounted for almost 57% of the identified attacks while only 40% have been conducted by whit-hat hackers aiming to identify vulnerabilities and to improve the cybersecurity aspect of the industry. No segment of the automotive industry is nowadays clear from cybersecurity attacks and involved threats. Not even newly concepts such as subscription services or EV which can be impacted by vulnerabilities of the charging infrastructure [Levy (2022)]. The rapidly growing demand of electric vehicle charging stations, cybersecurity threats have been neglected. Various security flaws have been discovered by white-hat hackers, from infiltrating home networks to disabling charging ports or even removing the owner's access to the vehicle [Levy (2022)].

With arising number of cybersecurity attacks registered by automotive manufacturers, OEMs are now required to implement proper cybersecurity management procedures during product development, manufacturing process as well as during the post-production lifetime of the product. OTA updates must now also focus on mitigating continuously monitored cybersecurity risks. A successful company will now be characterized by a strong organizational risk management strategy including risk identification, risk mitigation and risk monitoring [Brown et al. (2021)].

Vision 2030

It is believed that four major trends will shape the automotive industry in the current decade. Changing revenue streams and marketplaces, consumer mobility behavior modification, spread of cutting-edge technology, and complex cooperation and competition are the trends that will modify the traditional automotive market [Kaas et al. (2016)]. At the same time, it is widely believed by experts that the automotive industry is ripe for disruption. The industry will look completely different in the next decade as well-established models such as the implemented just in time model must be now reanalyzed because of the component and raw material shortages.

The already changing revenue streams of the automotive industry will expand to data-driven services and on-demand mobility [Kaas et al. (2016)]. Until the end of this decade, it is believed that this will increase the industry revenue with 30%, an additional 1.5 trillion USD, accelerating the yearly industry growth to 4.4%. Passenger vehicles are rapidly becoming a method for drivers and passengers to spend their commute time for personal pursuits, include new offered services and media entertainment. Due to the growing interest towards shared mobility, the vehicle unit sales will annually increase at a lower rate than before. Predicting that the sales will have an annual growth of 2% in the current decade, comparing to the 3.6% growth that the marked was used to in the last five years [Kaas et al. (2016)]. On the other hand, to reach the plan of switching to EVs, the first major barrier must be overcome. The lack of charging infrastructure is the main fear of consumers when it comes to “range anxiety” and adoption of the new EV concept [Brown et al. (2021)]. Another big challenge for the European automotive sector is to assure supply chain resilience for critical raw material (CRM) [Brown et al. (2021)]. Without clear solutions, the CRM shortage will drastically impact the European OEMs. The nowadays dependency on Chinese and Taiwanese suppliers has already been proven to be a stress test for the European industry. However, improvements in the Li-ion battery supply can already be seen with more factories opening in the EU [Brown et al. (2021)].

To keep the share of the automotive market, OEMs must now change their strategy from providing “hardware” to providing integrated mobility services [Kaas et al. (2016)]. At the same time, the importance of B2B sales is highlighted by the rapidly evolving shared mobility service providers, obliging OEMs to also focus on their new business customers. Therefore, the automotive industry must nowadays face many challenges but at the same time, it provides a large variety of diversification opportunities for conventional OEMs to survive the continuously evolving and demanding automotive sector.

Conclusions

The automotive industry still faces challenges that have stared even before the COVID-19 outbreak. In addition, the geopolitical tensions and pandemic related shortages will continue to have a big negative impact on the industry's future. Some automotive manufacturers and supplier have proven through the implementation of lessons learned during the last decade's recession that they have found themselves in a better financial position during the pandemic than others [Vitale et al. (2020)]. Even with the arising opportunities, it is anticipated that the passenger vehicle manufacturing capacity utilization will stay below 75% until 2027 [Vitale et al. (2020)]. Automotive manufacturers might find it hard in the near future to take full responsibility of a vehicle's production as the emerging technologies are adding to the complexity of the final, now sophisticated, product. Therefore, more partnerships will arise between OEMs themselves or with other entities, working together towards improving the experience and safety of road users. The European and American OEMs must realign their strategies to reduce the industry's dependency on Asian suppliers. Component shortage together with significant price increase of raw materials and electricity will lead to higher production costs. The automotive sector will slowly follow the path of tech giants, with businesses emerging as technological leaders in various specialties and occasionally establishing standards in the industry [Hensley et al. (2022)]. The shifting demand of the consumers is obliging OEMs to focus on alternative solutions to conventional vehicle ownership such as vehicle subscription services but also to strengthen their business model in the B2B market.

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IDENTIFICATION OF INFLUENCE FACTORS ON UNIVERSITY PROJECTS DURING THE SARS COV 2 PANDEMIC

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Abstract

Purpose – *The paper aims to identify the factors that exert a significant influence on the members of project teams developed in universities, planning their activities and factors and carrying out the activities of the project teams under the conditions of the SARS COV 2 pandemic.*

Methodology/approach – *In order to carry out the research, specific aspects in the management of human resources were individualized within the projects regarding human resource planning.*

Findings – *The present research refers to the management of human resources in Romanian university projects from the point of view of the influencing factors of human resources planning under the conditions of the pandemic.*

Research limitations/implications – *Social distancing, as a measure during the COVID 19 period, determined the forcing of global digitization, implicitly the activities within the projects, which according to the initial planning, should have been carried out face to face, were cancelled.*

Practical implications – *The results of the research could be of interest to project managers, human resources managers, other categories of professionals whose activities concern the sphere of human resources.*

Originality/value – *The study captures a series of problems and restrictions faced by the management of human resources within the projects carried out in higher education institutions in Romania, during the pandemic period.*

Key words: COVID 19, SARS COV 2, Human resource management

Introducere

Economic studies demonstrate the quality of higher education and vocational training is essential for economies that intends to adopt the value chain beyond simple manufacturing processes (Tanase & Tanase, 2011). Globalization has required the employment of trained personnel, able to adapt to the environment, a fact proven during the COVID 19 pandemic.

Human resource management has evolved from the „personnel” function to the strategic human resource management function (Deadrick & Stone, 2014). The human resource planning activity within the projects was also propelled along this trajectory, as a function of human resource management. The study aims to identify the factors with a significant influence on human resource management within university projects under pandemic conditions.

The research on the management of human resources in Romanian university projects, influencing factors of human resources planning under the conditions of the COVID 19 pandemic, had the following objectives:

- Identification of the factors with significant influence on the human resource within the university projects
- Planning the activities of the participants in the project teams
- Factors in carrying out activities for project team members during the SARS COV 2 pandemic

- Evaluation and quantitative analysis of human resources management in Romanian university projects, influencing factors of human resources planning in pandemic conditions
- Designing a model regarding the human resources management of the projects, with the objective: The need to identify, rank and complete the factors that exert a significant influence on the human resource.

Any scientific work must be based on a well-established plan, which respects a working model (Lupu, Rusu, Oniciuc, & Rusu, 2006). The methodological plan for the research went through the following stages:

- Identification of the influencing factors of human resources planning
- Development of research tool
- Choosing and describing the sample
- Data collection
- Qualitative and quantitative analysis of the collected data
- Synthesizing the information obtained
- Reporting

In the research, the techniques and tools of search and data collection used was the questionnaire survey, through which the quantitative research was carried out.

I designed a questionnaire structured on sections:

- the need to identify the factors under the conditions of the pandemic
- identifying the influences of the factors on the human resources management of the projects
- researching the influence of factors on the management and planning of human resources in the specific conditions of the pandemic.

In modern times the health, morale and motivation of employees are important factors when an organization deals with crises. Managers must adopt measures to maintain employee trust, not only during crises, but also in normal life conditions (Vardarlier, 2016).

In 1954 Abraham Maslow published the pyramid of needs. The needs are instinctive, as they climb the pyramid, they manifest themselves depending on the degree of education and the personality of each individual. The spread of the COVID 19 pandemic generated restrictions of an economic, social, cultural and last but not least health nature. It has been observed that within Maslow's pyramid, the need for digital technology is imposed, a necessity that falls on any of the steps, tending towards the base of the pyramid.

The Authority for the Digitization of Romania was established in 2020, with the role of coordinating the implementation of strategies and policies in the field of digital transformation and the information society, in accordance with European policy (Commission, 2021).

In order to ensure the necessary human resources in the development and realization of university projects, in pandemic conditions, a rigorous planning of the activities carried out exclusively online was necessary.

Table no I the problems identified, generated by factors with significant influence on human resource in higher education institutions, are reproduced.

Internal and external factors can have a negative impact on the project, can delay or lead to its noncompletion. The project manager has the task of risk analysis, in order to prevent possible problems.

Personnel planning (Prodan, 2011) involves identifying the future needs of the organization and determining the number of employees that must be recruited by the organization at a given time.

Table no I. Identification of human resources problems in the university and projects under the influence of some factors.

Factors of influence	Problems identified
Internal factors	
Diversity of training and concerns	-The research activity, as well as the administrative one, are carried out in parallel directions, the staff do not interact -The activity of the project teams is carried out independently of the basic function, or they can be carried out identically with the tasks of the basic function, by activity categories according to the Gantt chart
Level of expertise	-In higher education, expertise is very well established in the field of employment skills and through annual evaluations. -Within the projects, the experience accumulated throughout the career is personal, it can only be valued by coopting and working in teams
Ways of selecting team participans from the univerity's point of view	-The selection is made on the basis of the internal procedures regarding the human resources policy of the institution, in conjunction with the national legislation -For projects, the selection is made according to manuals, guides, internal and international instructions aligned with Romanian legislation
External factors	
The SARS COV 2 pandemic	-Limiting measures and even bans on leaving were imposed homes, by military orders in the state of emergency and then in the state of alert -Sets of rules regarding social distancing were issued, so interviews, work meetings, mobility on projects were cancelled -Online platforms had to be identified, resources for paying subscriptions, purchasing software and hardware for running activities exclusively in the online environment
Budget constraints	-Often the budgets are not enough, a problem that leads to great sacrifices in order not to compromise on quality -They are imposed and generate an interdependence between the weight of direct expenses versus indirect ones
Human resource funding restrictions	-These restrictions lead to the loading of the basic norm, by carrying out additional activities of the nature of projects -Certain projects did not provide a budget for financing human resources. Through volunteer work, team members are not motivates to get involved in this type of activity
Restrictions of the number of participans in the team	-The need to fulfill some activities is created, which lead to overwork of team members
Restrictions on team structure	-The lack of a staff with certain functions and expertise, leads to the execution of some activities by learning „on the go” by the team members, who become overcrowded
Restrictions on the periodic evaluation of human resource activities	-Evaluating activities late, or not at all, is reflected in sentimental frustration regarding the reward

Following Romanian's integration into the European Union, it was noticed that the activities are oriented towards the absorption of funds, so the universities have transposed the Standards into their own work procedure.

As part of the Research on specific aspects in human resource management of human resource planning projects, normative acts were studied find out about: notions about types of projects; projects life cycle; how to identify a problem; target group and beneficiaries; the purpose and objectives of the projects; the activities; results, impact and indicators; risk managemen; monitoring and evolution; budget; the sustainability plan. The pandemic has attracted extreme military and civilian measures: social distancing and the orientation of all activities only in the online environment.

The evaluation stage and quantitative analysis regarding management of human resources in Romanian university projects, influencing factors of human resources planning under the conditions of pandemic restrictions was carried out as follows:

- to determine the aspects regarding the quality of human resources planning, the exploratory research techniques consisted in consulting the specialized literature, internal documentation: procedures, decisions, service notes, job descriptions, as well as external: guides, manuals, legislation and last but not least, online interviews with managers of different structures, employees of the human resources department.
- investigating the links between the most important factors that exert a significant influence on the human resource within higher education institutions and the aspects regarding human resources planning.

The Questionnaire created and distributed through the Google Form application was used, in August 2021, applied to 44 managers and members of project teams, or employees of prestigious universities in Romania.

The questionnaire was structured: General characteristics; Human resource planning in accessed projects; Factors influencing human resources planning under the conditions of the pandemic; Expected results.

Following the processing of the sample data in the SPSS Statistics application, the respondents identified external factors disrupting the activity, and the analysis of the variables for human resource planning in projects accessed by the university, we reproduce some sequences:

Table no II. In the conditons of some critical situations at a global level in the last decade, from the economic crisis to the crises generate by pandemic COVID 19 your activity did it suffer in conection with projects ?

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid yes	30	68,2	68,2	68,2
no	13	29,5	29,5	97,7
I do not know	1	2,3	2,3	100,0
Total	44	100,0	100,0	

Table no II 68.2 percent of respondents say that their own activity was influenced by COVID, 29.5 percent of respondents say that their own activity was not influenced by COVID, and 2.3 percent do not know.

3. CARE SUNT PRINCIPALII FACTORI INTERNI CARE V-AU PERTURBAT ACTIVITATEA PE PROIECTE?

32 responses

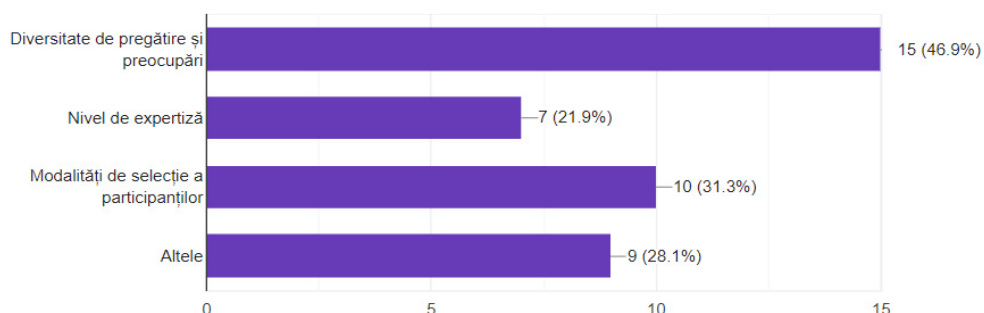


Figure no 1. The respondents identified as internal factors disrupting the activity: 46.9 percent the diversity of training and concerns, 21.9 percent the level of expertise, 31,3 percent affirm that the method of selection, and 28.1 percent see other factors.

5. CARE SUNT PRINCIPALII FACTORI EXTERNI CARE AU PERTURBAT ACTIVITATEA DVS. PE PROIECTE?

37 responses

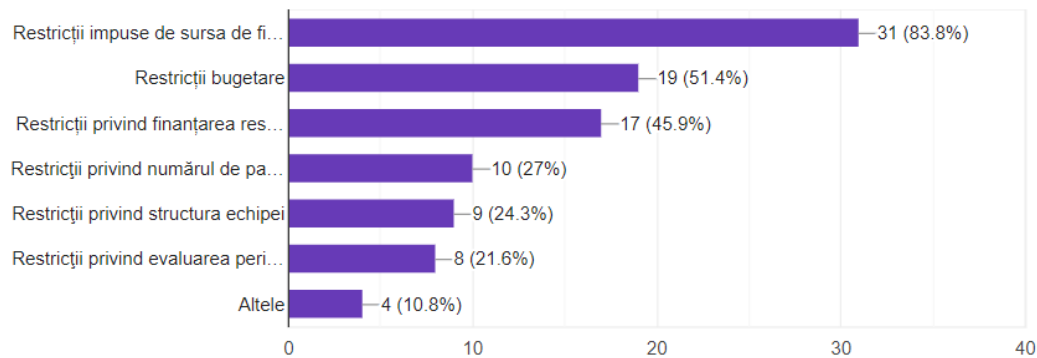


Figure no 2. The external respondents disrupting the activity identified : 83,8 percent noted the restrictions imposed by the funding source, 51.4 percent the budget restrictions, 45,9 percent surprised restrictions regarding financing, 27.0 percent were influenced by the number of participants in team, 24.3 percent were disturbed by restrictions regarding the team structure, and 21.6 percent are affected by the evaluation, and 10.8 percent invoke other effects.

Analyzing the results after applying the questionnaire, the following aspects were distinguished:

General characteristics: the questionnaire was addressed to the project managers, or members of university project teams, to which 44 respondents answered. We can state that the respondents have a seniority of 10-15 years to over 25 years; with higher education: bachelor's degree, master's degree, doctorate and postdoctorate; aged between 26 and over 65 years.

From the point of view of human resource planning in accessed projects , recruitment, selection, and hiring per project will be carried out, after a careful analysis of the human resource policy and the budget regarding personnel expenses. Recruitment is done by the department involved in the realization of the project both from the internal and external environment.

In the section: Influencing factors of human resources planning in the conditions of funding failures and the COVID 19 pandemic: 68.2 percent of the respondents stated that project activity suffered due to interna land external factors, among which we list: the rigidity of the conditions imposed by the projects regarding human resources, delayed financing, legislative restrictions regarding the time worked on the projects, implicitly the salary and last but not least, the restrictions imposed by the pandemic.

In the Expected results section: the interviewees considered that they fulfilled their mission in the realization of the projects, as members of the teams, even from the external environment of the university. It has been demonstrated that a correctly made planning ensures the necessary human resources to achieve the objectives and complete the projects.

Within the Research on specific aspects in human resource management of human resource planning projects, it was taken into account that the disturbances caused by COVID 19, in all fields of activity, were manifested at a global level. The entities were affected financially, operationally and personally, a situation in which they looked for solutions to continue their activity, and the long term to obtain increases. Postpandemic conditions of stress and despair could create opportunities for illegal and fraudulent activities.

The design of a model regarding the human resources management of projects, having as its objective the need to identify, prioritize and complete the factors that exert a significant influence on the human resource under the conditions of the SARS COV 2 pandemic, as a suport for the interested factors.

The personal contribution consisted in the creation of a comparative model based on comparison criteria between project human resources management planning and university human resources

management, under the conditions of the pandemic. Establishing on the basis of the job descriptions and the responsibilities of the university human resources management personnel, the activities of the personnel compatible with the members of the project team, of specific tasks related to the project that can periodically be entered in the job descriptions.

Conclusions

In the current context of the pandemic and postpandemic period, **the Authority for the Digitization of Romania** has issued strategies and policies for the implementation of digitization. As a result, universities have redefined their objectives by adapting both the teaching process and research, respectively the development of projects to the online environment.

The study undertaken specific aspects in the human resources management of the human resource planning projects, beyond the social, economic and health blockages, forcing a series of restrictive measures. But the planning was imperatively necessary to ensure the qualified human resource and to identify reserves of specialists, who contributed to the completion and validation of each stage of the projects. Through the care of the project managers, a risk analysis was made to evaluate the problems caused by internal and external factors on the projects, with the observation that poor planning can contribute to the failure of the project.

The analysis regarding human resource planning indicated that the criteria regarding specialization, homogeneity of teams, qualification of project team members, participation in various projects and work procedures were revised and adapted to ensure the achievement of project objectives.

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REUSE AND REPAIR OF ELECTRICAL AND ELECTRONIC EQUIPMENT

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Abstract

The purpose of this paper is to analyze how circular economy procedures help reuse WEEE and identify the factors that led to the generation of waste electrical and electronic equipment during COVID-19.

The methodology applied in this work is the method of qualitative analysis of the secondary data from the specialized literature, based on the criteria for elaborating a systematic theoretical review in order to map the existing knowledge regarding the evaluation of the reuse and repair of waste electrical and electronic equipment

Findings A total of 48 scientific articles were published between 2017 and 2022. The articles were identified based on appropriate sets of keywords and terms: reuse, circular economy, repair. Following the filters applied, such as the type of document, and the Web of science category, there are a number of 21 articles left that have been analyzed yourself

Research limitations/implications The literature contains a fairly small number of reports on the management and life-cycle extension of electrical and electronic waste

Practical implications This method of reusing waste electrical and electronic equipment allows the product to retain its economic value for as long as possible, thus helping both the social and the economic environment

Originality/value The most effective end-of-life option for waste electric and electronic equipments is reuse, a good option for environmental impact and socio-economic benefits. Thus, following these analyzed articles, measures are recommended to improve the management of waste electrical and electronic equipment at a global level, more precisely the inclusion of the principles of the circular economy in the production of electrical and electronic equipment.

Key words: E-waste, reuse, circular economy, repair, end-of-life.

Introduction

The dynamization of the urbanization process, the community of consumers, the growth of the global population, the development of information and communication technology, the incessant development of the living standards, the reduction of the life cycle of products, all these have contributed since the end of the XX th century, to the amplification of the volume and the branching of waste streams. As regards the sudden minimization of natural resources, the rapid degradation of soil, air, water quality and the deterioration of natural ecosystems, international interests in waste management have taken on great importance in identifying the best and safest solutions and technologies for waste management

In this situation, waste management has become a real substantive issue in terms of future socio-economic development, a direct consequence of a present economic development of a linear type. One of the special categories, with a high degree of difficulty in terms of capitalization, is given by electrical and electronic equipment. This waste has been nominated as the fastest growing waste globally (Menikpura, Santo, Hotta, 2014; Islam et. al., 2016; Shittu, Williams, Shaw, 2021), thanks to the growth of industrialization and digitization.

The outbreak of coronavirus disease (COVID-19) in 2019 has changed the direction of events globally. This disease has had major consequences for all sectors of the economy, including the educational, health and environmental sectors. The imposition of lockdowns and quarantines has caused humanity to make more and more use of technology and also TIC equipment, as schools have taken online courses. The increased use of these devices is not without environmental consequences. Some of the likely challenges are the increased import of electronic waste (e-waste) in the form of used electronic devices and the challenge of disposing of these devices once they reach the end-of-life stage and become waste.

Global E-waste Monitor 2020, published an announcement saying that in 2019, 53.6 million Mt of waste electrical and electronic equipment was generated, resulting in a total of 7.3 kg per capita. However, it is estimated that the overall amount of waste electrical and electronic equipment will increase by 2 Mt per year. Unfortunately, specialists estimate that the global quantity will exceed 74 Mt in 2030.

Thus the role of the circular economy is to maximize resource efficiency by keeping materials at the highest value, which can be achieved by reusing, reconditioning, remanufacturing products (Lakatos et al., 2018). When the product is maintained for as long as possible on the market, then the product has the highest level of efficiency, so it requires the prioritization of reuse (Rada, Cioca, Ionescu, 2017)

The extension of the service life of a product is given by the reuse of waste equipment and its components.

The reuse action means the recovery of the product at the end-of-use stage and its reintroduction on the market. (Cioca et al., 2015)

The EU's circular material utilization rate (so-called the circularity rate) in 2020 reached 12.8% which means that almost 13% of the material resources used in the EU come from recycled or repaired waste. One of the main barriers that stand in the way of reuse is the way products are collected after they are thrown away at the end of their lives. These items shall be considered as waste before they are recovered. These products processed in this way end up damaged and their reuse value is small or not at all. The first step in a process of preparing for reuse begins with sorting the items to select the items that are ready for reuse, this process is done through a visual inspection, applying a safety test and a functionality test after this process follows the deletion of the data from the device and then the device is disassembled, cleaned and repaired.

This work emphasizes the most significant publications in the field of reference of electrical and electronic equipment. The study's goal is to examine the role that circular economy practices have in WEEE reusing.

Methodology

This study addresses a method of qualitative analysis of secondary data from the literature, based on the criteria for developing a systematic theoretical review. Thus, the process developed by Kitchenham (2004) of systematizing previous empirical results was followed, applying the following steps: (1) planning - motivation and protocol; (2) conducting the review - identification the research, selecting the primary researches, appreciating the value of the researches, filtering the data, and the last phase (3) describing the effects of the review. To identify the relevant studies, appropriate sets of keywords and terms were used: reuse, circular economy, repair.

These research models, which contain topics related to the reuse and repair of waste electrical and electronic equipment, are usually published in journals that have as main topics the environment, sustainability and sustainability and also waste management. The vast majority of the articles analyzed most often refer to three processes such as collecting, preparing for reuse and redistributing them.

To begin with, a total of 48 scientific articles were identified following the assignment of keywords. The first filter applied was the one represented by the year of publications, the interval 2017 and 2022 was chosen. As a result of this filter, 46 items remained. The second filter selected was the document type filter, where only the items as a document type were selected and 34 items remained by selection.

The last filter applied was the one represented by the category Web of science where we chose the categories Environmental Engineering Environmental Sciences, Technology Green Sustainable

Science, Environmental Studies following this filter remained a number of 21 articles relevant to our studies.

Table 1 lists the 21 articles that have been studied in depth and figure 1 shows the number of articles published per year, where in 2021, following the selections, 5 articles were published, in 2020 4 articles were published and in 2017, 2018, 2019, 2022 3 articles were published each.

Table 1. Studied articles

2022	2021	2020	2019	2018	2017
Andersen, T. (2022). A comparative study of national variations of the European WEEE directive: manufacturer's view. <i>Environmental Science and Pollution Research</i> , 29(14), 19920-19939.	Pérez-Martínez, M. M., Carrillo, C., Rodeiro-Iglesias, J., & Soto, B. (2021). Life cycle assessment of repurposed waste electric and electronic equipment in comparison with original equipment. <i>Sustainable Production and Consumption</i> , 27, 1637-1649.	Johnson, M., McMahon, K., & Fitzpatrick, C. (2020). A preparation for reuse trial of washing machines in Ireland. <i>Sustainability</i> , 12(3), 1175.	Cole, C., Gnanapragasam, A., Cooper, T., & Singh, J. (2019). An assessment of achievements of the WEEE Directive in promoting movement up the waste hierarchy: experiences in the UK. <i>Waste Management</i> , 87, 417-427.	Zacho, K. O., Bundgaard, A. M., & Mosgaard, M. A. (2018). Constraints and opportunities for integrating preparation for reuse in the Danish WEEE management system. <i>Resources, Conservation and Recycling</i> , 138, 13-23.	Parajuly, K., & Wenzel, H. (2017). Potential for circular economy in household WEEE management. <i>Journal of Cleaner Production</i> , 151, 272-285.
Peiró, L. T., Fernández, B. G., & Durany, X. G. (2022). Investigating a repair workshop: The reuse of washing machines in Barcelona. <i>Sustainable Production and Consumption</i> , 29, 171-179.	Hischier, R., & Böni, H. W. (2021). Combining environmental and economic factors to evaluate the reuse of electrical and electronic equipment—a Swiss case study. <i>Resources, Conservation and Recycling</i> , 166, 105307.	Boldoczki, S., Thorenz, A., & Tuma, A. (2020). The environmental impacts of preparation for reuse: A case study of WEEE reuse in Germany. <i>Journal of Cleaner Production</i> , 252, 119736.	Messmann, L., Boldoczki, S., Thorenz, A., & Tuma, A. (2019). Potentials of preparation for reuse: A case study at collection points in the German state of Bavaria. <i>Journal of Cleaner Production</i> , 211, 1534-1546.	Bonoli, A., Dolci, N., Foschi, E., Lalli, F., Prandstraller, D., & Zanni, S. (2018). End Of Service Scenario For Universities' Informatic Equipment: Recovery And Repair As Educational And Research Tool For Circular Economy And Urban Mining. <i>Multidisciplinary Journal for Waste Resources & Residues</i> , 4, 90-97.	Parajuly, K., & Wenzel, H. (2017). Product family approach in e-waste management: a conceptual framework for circular economy. <i>Sustainability</i> , 9(5), 768.
Rudolf, S., Blömeke, S., Niemeyer, J. F., Lawrenz, S., Sharma, P., Hemminghaus, S., ... & Herrmann, C. (2022). Extending the Life Cycle of EEE—Findings from a Repair Study in Germany: Repair Challenges and	Shittu, O. S., Williams, I. D., Shaw, P., Montiero, N., & Crefield, R. (2021). Demonstrating EEE recovery for reuse in a distinct urban mine: a case study. <i>Detritus</i> , 15, 78-93.	Poppelaars, F., Bakker, C., & van Engelen, J. (2020). Design for divestment in a circular economy: Stimulating voluntary return of smartphones through design. <i>Sustainability</i> , 12(4), 1488.	Kim, B., Azaropantel, C., Pietrzak-David, M., & Maussion, P. (2019). Life cycle assessment for a solar energy system based on reuse components for developing countries. <i>Journal of cleaner production</i> , 208, 1459-1468.	Coughlan, D., Fitzpatrick, C., & McMahon, M. (2018). Repurposing end of life notebook computers from consumer WEEE as thin client computers—A hybrid end of life strategy for the Circular Economy in electronics. <i>Journal of Cleaner Production</i> , 192, 809-820.	Arp, H. P. H., Morin, N. A., Hale, S. E., Okkenhaug, G., Breivik, K., & Sparrevik, M. (2017). The mass flow and proposed management of bisphenol A in selected Norwegian waste streams. <i>Waste Management</i> , 60, 775-785.

Recommendations for Action. <i>Sustainability</i> , 14(5), 2993.					
	Gavrilescu, D., Enache, A., Ibănescu, D., Teodosiu, C., & Fiore, S. (2021). Sustainability assessment of waste electric and electronic equipment management systems: Development and validation of the SUSTWEEE methodology. <i>Journal of Cleaner Production</i> , 306, 127214.	Wilkinson, A., & Williams, I. (2020). Why do (W) EEE hoard? The effect of consumer behaviour on the release of home entertainment products into the circular economy. <i>Detritus</i> , 12, 18-33.			
	Boldoczki, S., Thorenz, A., & Tuma, A. (2021). Does increased circularity lead to environmental sustainability?: The case of washing machine reuse in Germany. <i>Journal of Industrial Ecology</i> , 25(4), 864-876.				

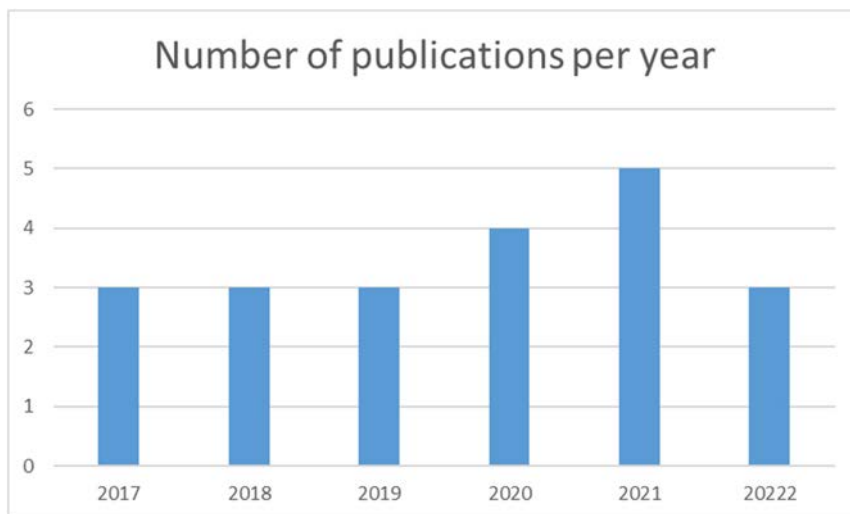


Fig.1. Number of publications per year

The environmental aspects of extending the life cycle of waste electrical and electronic equipment received the most attention in the revised articles. Also, the articles with the theme of preparing for reuse

received quite a lot of attention in the articles we analyzed. Unfortunately, there are few studies in areas related to the design of equipment or the environmental impact of waste electrical and electronic equipment.

Most of the papers have as their main topic the analysis of the challenges between variables and concepts and also to capitalize on the benefits of the circular economy.

Few articles aim to provide methodologies, indicators, guidelines or to compile practical solutions to the problems faced by the field of e-waste and electro-nice management, especially in the reuse and repair phase. So most of the publications stagnate at the theoretical level, while a small part of the attention is paid to the design of solutions and applications in the analyzed field.

Discussion and conclusions

Our review outlines the importance of activities in the reuse sector of waste electrical and electronic equipment. In order to make this sector as efficient as possible, it is necessary to regulate the activities of re-use and preparation for re-use. This waste electrical and electronic equipment has a lot of valuable materials from which secondary raw materials can be obtained. Such losses of raw materials endanger the next production of electrical and electronic equipment. The inclusion of circular economy principles in the field of electrical and electronic waste therefore leads to the most effective implementation of environmental protection.

Despite the fact that the first article chosen was from 2017, the number of publications began to increase. The circular economy has begun to grow considerably in recent years, bringing a dominant significance in vis-à-vis sustainability flows. In general, the articles have appeared in different magazines such as Sustainable Production and Consumption, Journal of Cleaner Production, Resources, Conservation & Recycling, Sustainability, Journal of Industrial Ecology Wiley, Environment International, Waste Management.

WEEE is a research and development framework in both developed and developing countries. Most of the articles aim to analyze the challenges or correlations between variables and concepts or to quantify the impacts of the circular economy. Few articles aim to provide methodologies, indicators, guidelines or to compile practical solutions to the problems faced by the field of e-waste management, especially in the reuse and repair phase.

The effective implementation of the way of prolonging the life cycle through reuse and of the legislative frameworks leads to the mitigation of the generation of waste electrical and electronic equipment even during some disturbances such as the COVID-19 pandemic.

However, this work could be a start for researchers or for legislative frameworks to understand how important it is to extend the life cycle of a product by reusing and repairing it.

Most of the articles aim to analyze the challenges or correlations between variables and concepts or to quantify the impacts of the circular economy. Few articles aim to provide methodologies, indicators, guidelines or compile practical solutions to the problems facing the field of electrical and electronic waste management, especially in the reuse and repair phase. So most of the publications stagnate at the theoretical level, while a small part of the attention is given to the design of solutions and applications in the analyzed field.

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2022

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AGILE EDUCATION – A CHALLENGE OR OPPORTUNITY IN POST PANDEMIC UNIVERSITIES?

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Abstract

Purpose – *The paper analyzes the possibility of introducing Agile principles and practices in higher education institutions. This concern stems from two main factors: on one hand, the demonstrated efficiency of Agile methodologies when implemented by remote teams and on the other, the growing demand for digitalization in all aspects of daily life.*

Methodology/approach – *A qualitative and ongoing longitudinal study was conducted, which used focus groups of students from the University of Petrosani.*

Findings – *The results of the study highlight a difference between the results obtained when applying the Waterfall approach to the educational process and the Agile methodologies. The differences manifested in the organizational approach, the way that courses were held and the overall results obtained by the students.*

Research limitations/implications – *A quantitative study will follow the qualitative one to find a clear demarcation between Waterfall and Agile in education in terms of performance for a sustainable development of hybrid HE.*

Practical implications – *It is relevant to look at the ways in which HE can be managed from a project management perspective and identify the best suited alternative that can fit the requirements in the current socio-economic context.*

Originality/value – *The paper proposes an approach to the adaptation of Agile for software development in the context of HE.*

Key words: *Higher education, digitalization, hybrid*

Introduction

Project management tools and practices have proven useful for hybrid working arrangements and have the potential ability to answer both the challenges as well as the opportunities of the current context where Higher Education institutions are looking for solutions to digitalization and a transition to a hybrid form of education. Given this aspect, it is relevant to look at the ways in which Higher Education can be managed from a project management perspective and identify the best suited alternative that can fit the requirements of these institutions in the current socio-economic context.

The research introduces a series of notions and approaches to make it possible to create an analogy of the didactic activities deployment in Higher Education (HE) with software development lifecycles (SDLC).

The research is justified by the current trend of HE transformation and digitalization after the pandemic period. Thus, we must admit that the traditional, classic teaching identified with the linear, sequential approach of SDLC did not find us prepared for the changes and challenges brought by the pandemic. As any experience must be used for development, we look at how we can integrate this experience and turn it into something useful and valuable from the perspective of a hybrid, adaptive and flexible HE context.

The paper analyzes the possibility of introducing Agile principles and practices in Higher Education institutions. This concern stems from two main factors: on one hand, the demonstrated efficiency of

Agile methodologies when implemented by remote teams and on the other, the growing demand for digitalization in all aspects of daily life. The study aims to also identify the key differences between the usage and implementation of regular education practices and adoption of Agile inspired methodologies.

The paper presents in the Literature review section the analogy with the SDLC, that was the basis of our approach, and the trends towards Agile approaches in education. Then, following the focus group application in Materials and methods section, Waterfall vs. Agile in hybrid HE Section highlights the usable elements in the deployment of courses with digitization components, concluding with the fact that we must continuously adapt to stay competitive in any field.

Literature review

The evolution of education on the four levels, from Education 1.0 to Education 4.0, was achieved in parallel with the evolution of technology, initially by integrating the specific elements of Web 1.0 and Web 2.0, and currently the trend is to link Education 4.0 to Industry 4.0 as shown in Figure 1.

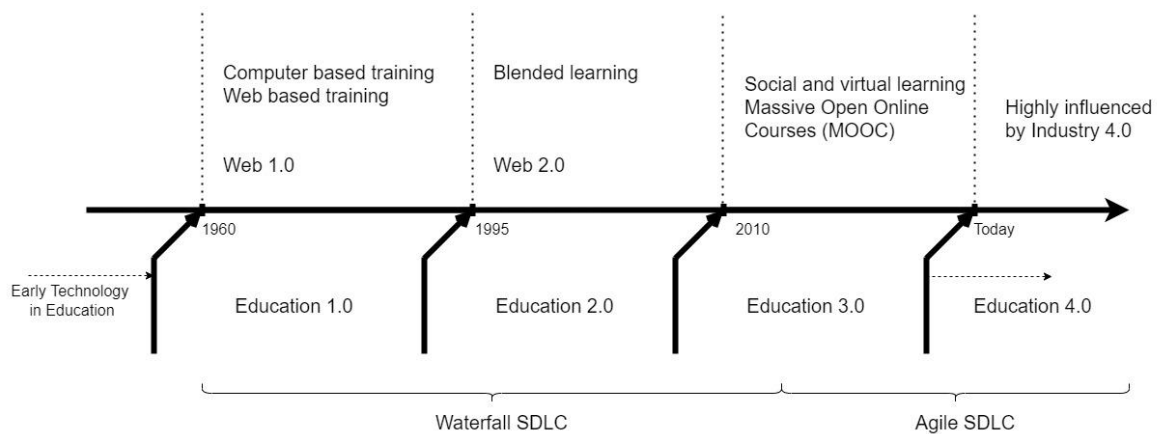


Fig.1. Education 1.0 towards 4.0

An extremely important milestone in the evolution of education were MOOCs, which existed before the pandemic period, and thus made a substantial contribution during the pandemic both as an alternative educational support and as an experience to learn from. The pandemic meant a pause for reflection for humanity. On the one hand, a conclusion could be that a better use of resources would be needed in any field, implicitly also in education, which should be much better related to the real needs of the society currently in Industry 4.0. However, another important problem rediscovered during the pandemic period is that man needs to interact with other people. Therefore, the digitalization of education must be done with great care to maintain human contact through which society has evolved so far. Speaking of the evolution of technology, we also pointed out the usefulness of SDLCs in Education.

The literature shows that there is interest in approaching Agile principles in education, demonstrated by the publication of the Agile Manifesto in Education (Kamat, 2012) and the application of Agile principles in learning (Lang, 2017). Stewart et al. (2009) showed how agile methods can be applied to many educational projects.

The effectiveness of Agile methodologies applied in online courses was discussed by Noguera et al., (2018). Ahmad et al., (2014), and Heikkila et al., (2016) report the use of Agile tools like the Kanban board in project-based learning (PBL). O. Meerbaum-Salant and O. Hazzan (2010) present the implementation of the "Agile Constructionist Mentoring Methodology" in high school.

The proof of the need to understand agile methodologies is given by the studies that show the fact that the curriculum is updated accordingly. (P. Maher., 2009)

Concerning one of the Agile methodologies, Scrum, there are scientific papers that tried to underline the power of Scrum in education (Zorzo et al., 2013). T. de Jager, (2015) presents the application of the Eduscrum method.

Scrum is mostly adapted in development of projects in undergraduate and graduate levels (R. Romeike and T. Gottel, 2012), (Missiroli, 2017), (Dovleac et al., 2018), (Fuad et al., 2022), but Scrum can also be used in HE projects (Von Wangenheim et al., 2013) and (Steghofer et al., 2017). Also, Scrum was used as a management method in interdisciplinary educational settings (Gestwicki & McNely, 2016) and to teach different subjects (Ringert et al, 2017). Duvall et al. (2017) implemented Scrum methodology in classroom management procedures and Grimheden, (2013) showed that Scrum methodology determined the students to achieve better results.

There are analyzes that compare Agile methodologies and plan-driven practices (P. Rundle and R. Dewar, 2006), respectively Agile methodologies and Waterfall methodology, showing that each of the two approaches has advantages that must be taken into account. There is even a statement made by Missiroli, (2017), according to which "teachers should try to introduce Agile concepts and methodologies, as they might become dominant in the next future", but also a conclusion regarding the introduction of a hybrid methodology, referred to as "Waterscrum" as the first step towards a complete acceptance of Scrum or Agile methods, highly influenced by Industry 4.0 towards Education 4.0.

Materials and Methods

The research methodology is presented in Figure 2, and it can be noticed that it has a strong starting point from the literature review - that highlights the previous approaches on Waterfall and Agile in education and also the values of SDLCs that can be used in education. Based on these, the applied research using the focus group technique provided results regarding the usage of Waterfall versus Agile approach. These, together with the ARACIS standards, have led to the proposal of an approach to deploy teaching activities based on Agile for hybrid HE.

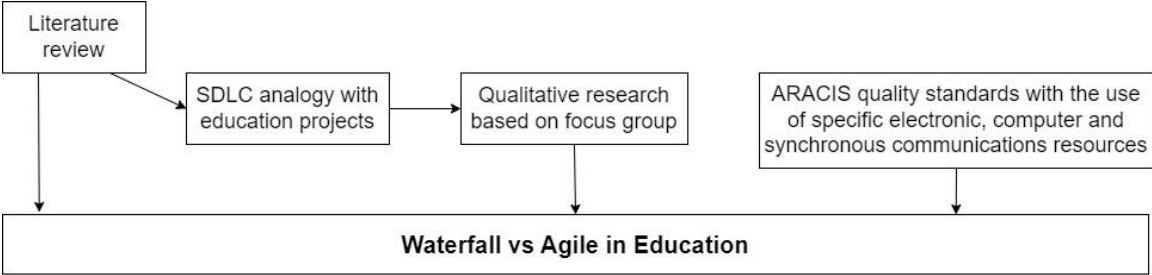


Fig. 2. The research methodology

For the research, the qualitative research tool known as the focus group was implemented in order to analyze the results obtained when using a Waterfall based approach versus an Agile approach in teaching higher education courses. Focus groups have been identified as a reliable source of obtaining data from participants, given the interactions between participants that can elicit data and ideas which might not be uncovered in traditional one-on-one questioning (Plummer-D'Amato, 2008). Furthermore, focus-group interviews, due to its dynamic has often deeper and richer interactions which in turn generate a larger range of data (Rabiee, 2004). Regarding the homogeneity of the focus group and the number of participants, it has been noted that although usually people with similar characteristics are part of the focus group, this is not necessarily relevant or mandatory in all cases, and the decision is highly dependent upon the purpose of the research project (Cameron, 2005). The rule of thumb regarding the number of participants has been pinned down to six to eight participants but the size has been observed to vary from three to twelve participants (Plummer-D'Amato, 2008).

In the case of the current research a total number of 24 participants have been part of four focus groups, each focus group containing six members. The participants were students from two bachelor programs at the Faculty of Mechanical and Electrical Engineering, in the field of Computer and System's Control (Computer Science and Applied Automation). Each bachelor study field had two focus groups, one debating the role, relevance and usefulness of Waterfall based learning and the second one focusing on the same aspects but in the case of Agile driven learning. The moderator for these focus groups has been the teacher that has worked together with the students and held courses for the Project Management discipline that they studied according to the curriculum.

Based on the results obtained by the focus groups and the discussions, along with results obtained by other research and examined during the literature review part of the paper and the quality standards established by ARACIS, the premises for a methodology for planning and delivering courses at HE level have been sketched as it can be observed in Figure 2.

The set of metrics that were used in order to evaluate the results of the conducted activities were based off the metrics described by Missiroli et al, which in their research examined the effects of Waterfall and Agile methodologies on organizing learning activities in the case of K-12 education (Missiroli, Russo, & Ciancarini, 2017) but for the case of the current research these were adapted to fit the qualitative aspect of the latter, as it can be observed in Figure 3.

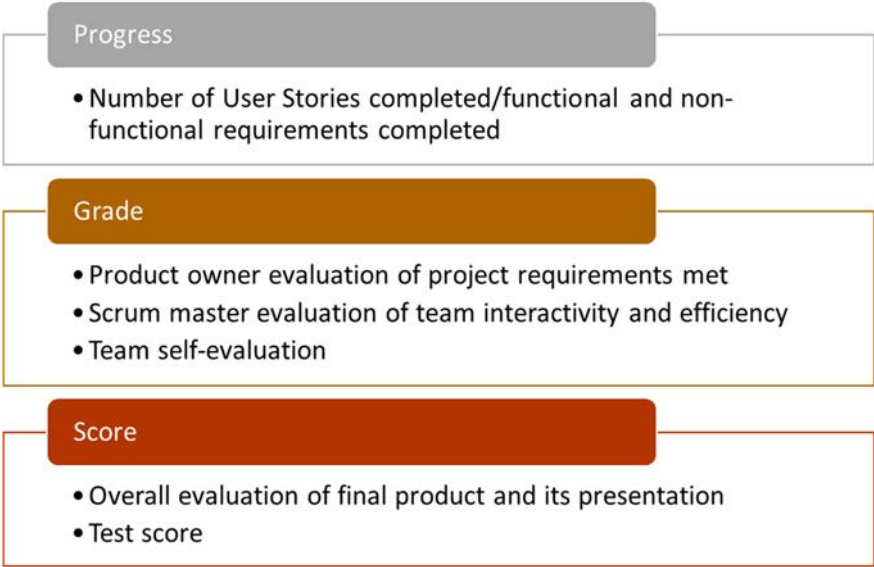


Fig. 3. Metrics

As it can be observed the metrics were concerned not only with the overall product but also the progress and the satisfaction and efficiency of the development team. The main concern in the case of the paper was not just the delivery of a qualitative product but also the experience of the participants and understanding how each development approach can serve them better.

Waterfall vs. Agile in hybrid HE

The Waterfall SDLC is suitable for the first levels of Education in which the contribution of technological tools was quite low, the implementation in the educational process did not allow the significant inclusion of feedback from students, as presented in Figure 4.

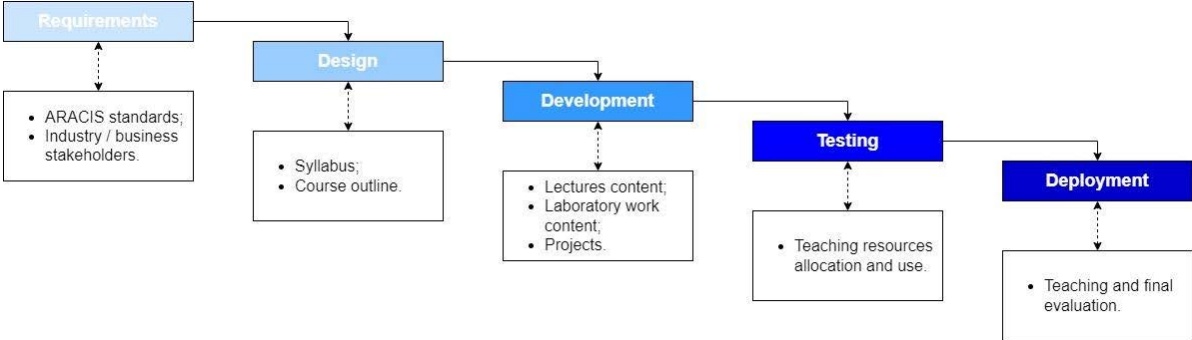


Fig.4. Waterfall model in HE

In Agile, even if technology is used to the fullest, the SDLC's scrutiny is driven by the interaction between all the human actors involved. As shown in Figure 5, in order to carry out the didactic activities for a

subject, the phases of the Scrum methodology are followed with their customization on specific HE elements. In each sprint there are tasks to be completed by the students with monitoring by the teaching staff, who train themselves during this period. The obtained results are discussed and are derived the refined requirements for the following tasks.

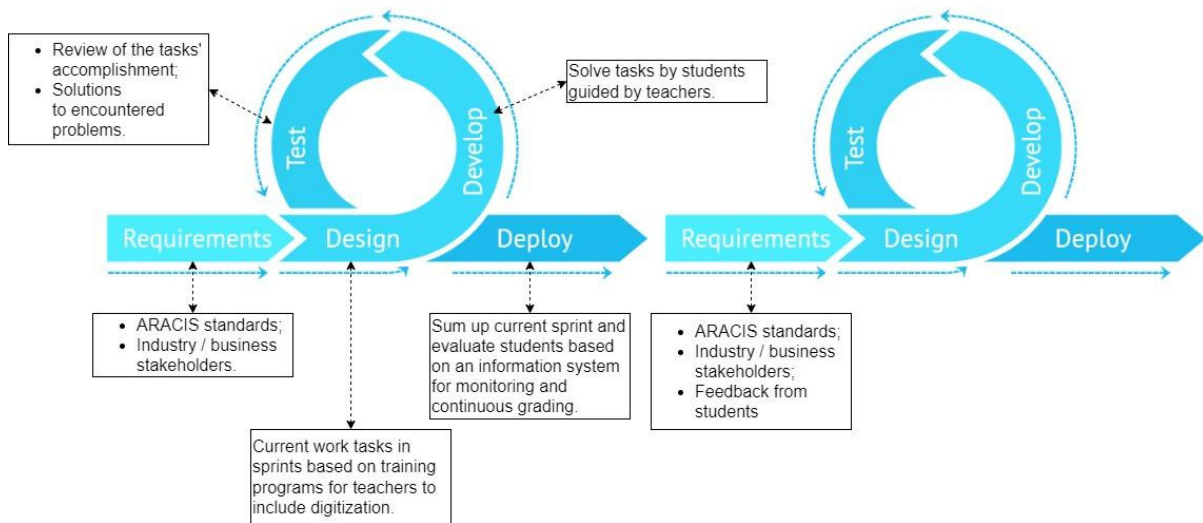


Fig. 5. Agile model in hybrid HE

An important difference between the two approaches that can be observed in Figures 4 and 5 is that if in the case of the Waterfall approach the level of knowledge is tested only in the last stage - deployment, in the case of the Agile approach there are two points at which the student's level of knowledge and comprehension is tested, in the test phase and in the deployment phase. This can be a starting for a better understanding of the overall performance obtained by the students.

Results

The conducted research can be summarized according to the main parameters as follows: the object of the study was the results obtained by groups of students which followed a Waterfall based approach to learning versus the students that followed an Agile based approach; the purpose of the study was to have an overview of the effects of Waterfall and Agile based learning approaching in HE project-based learning environments; the quality focus consisted of the results obtained by the students with the perspective of both teacher and student perception; the context of the research is applying various development methodologies in order to test relevancy for learning in the case of HE institutions.

Although the main concern of the focus group is to identify the participant's perception regarding a topic and not to obtain a consensus amongst these, the focus groups have unanimously identified Agile based approaches to learning and teaching as more efficient and better fit for the needs of today's generations. The participants also believed that the digitalization effort is a positive aspect of education and can yield plenty of benefits although some drawbacks were identified as well. These concerns could be addressed at least partially by the guidelines provided by ARACIS given the digitalization requirements in HE institutions given the type of subjects and the content that is considered to be taught in a hybrid manner.

The highest level of satisfaction in the case of participants was obtained in the teams that followed the Agile SDLC to their projects and the learning process. These two teams managed to get more work done, have had better results in terms of test scores to test their level of knowledge regarding the Project Management subject, and have emphasized the satisfaction obtained from reaching several small goals and being able to focus on small chums of work with constant feedback, rather than the teams working with the Waterfall SDLC.

The results of the research are in conformance with those of other research conducted on the topic, in terms of the positive feedback provided by both parties (students and teachers) when organizing the learning process in a modern, hybrid and digitalized way, thus showing a clear tendency towards embracing new technologies and methodologies in the educational context.

The results of the focus group together with those of similar previous research created the premises for further development of the research, by analyzing the use of the two methodologies (Waterfall and Agile) for the preparation of teaching activities.

Discussion and conclusions

The results of the study highlight a difference between the results obtained when applying the Waterfall approach to the educational process and the Agile methodologies. The expected differences manifested in the organizational approach, the way that courses were held and the overall results obtained by the students - both as grades at the end of semester but also as projects and assignment created by them. Some of the most significant differences included aspects such as: a different approach to organizing the content of the course through multiple sprints rather than following a traditional syllabus and course outline, the usage of assignments in a modular form rather than delivering a number of courses for each lesson and measuring final results. A quantitative study is expected to follow the qualitative one conducted in the current research paper.

In the current context where a transformation of education towards a hybrid HE is expected, and which will have to represent, for at least a period of time, a new stable state of the educational system, it is very important that the changes made are well founded and sustainable and do not cause uncontrollable instabilities. The educational system of a nation represents the brain of that nation, and what we witness these days should be treated with the same care, thoroughness and precision as a “brain surgery”.

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EDUCATION OF CIRCULAR ECONOMY AS A FOUNDATION IN THE POST-PANDEMIC RECOVERY IN ROMANIA

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Abstract

Purpose – *The scope of this study is to validate the importance of circular economy education in Romania.*

Methodology/approach - *The method used to explore the topic is primary data collection approach and documentary analysis. This extensive research used the questionnaire as a tool for collecting respondent's views. The aim of the questionnaire was to outline the knowledge towards circular economy and sustainability.*

Findings – *Among the respondents an average level of knowledge was identified. Education models have to be interactive, adapted to the field of learning and based on collaboration between public and private institutions. Target of the Sustainable Development Goals 4 (SDG 4) develop responsible consumption. Target of the SDG 12 is responsible consumption and production.*

Research limitations/implications – *Future research may determine education models based on the characteristics presented in this paper.*

Practical implications – *Educating consumers would provide information and raise awareness. Hence, the circular model is accepted and a sustainable lifestyle is created.*

Originality/value – *starting point for the development of circular economy education methods*

Key words: *Circular Economy, SDG, Education*

Introduction

The COVID-19 pandemic has created considerable challenges that weakened the achievement of the sustainable development goals defined by the 2030 Agenda (Cheng et al., 2021). However, on a more positive note, it has also offered a clean sweep. The world can benefit of this opportunity by considering more sustainable approaches (Leach et al. (2021).

Circular economy is a sustainable approach that supports the objectives of the SDGs. Of the 17 established goals, the circular model contributes to SDG 12 the most (Hofstetter et al., 2021). This goal refers to responsible production and consumption. However, one should distinguish between the goals that the concept influences or is influenced by. Undoubtedly, the implementation of the circular model has a positive impact on responsible production and consumption, but the question is which objectives have to be fulfilled first to successfully implement the model. Accordingly, this paper aims to highlight the importance of SDG 4 (quality education) before the circular economy implementation.

Starting from the premise that responsible consumption is contingent on consumer education, this paper seeks to validate the *importance of circular economy education*. Accordingly, the first objective of the paper is to determine the current level of awareness of the circular economy. The second objective deals with the *characteristics of efficient education models*. Finally, the paper illustrates the relationship between education and circular economy.

Literature Review

Romania is battling to implement circular economy practices. Other European Union (EU) countries are much ahead on all levels and in all fields (Marino and Pariso, 2020). For Romania to reach the level of other EU countries, it has to determine an appropriate legislation, encourage innovative ideas, define long-term solutions and last but not least, educate participants (Vermeşan, Mangău and Tiuc, 2020).

The circular economy (CE) is considered to be a long-term recovery strategy that generates environmental, economic and social advantages (Ellen MacArthur Foundation, 2020). Unlike the linear economy model, where the products proceed only one direction from the producer to the customer, in the circular economy the goods flow is bidirectional. Thus, products or materials come back to the service provider, product, or part manufacturer. Moreover, the bidirectional movement is carried out as often as possible for each product or material. (Ellen MacArthur Foundation, 2013). Consumers play an essential role because they are responsible with returning the products in order to preserve circularity. Therefore, it is fundamental to provide information and education to customers regarding the circular principles (Vehmas et al., 2018).

The importance of education is even included in more current definitions of the term CE. Thus, education is just as relevant as products' design in reaching the circularity of the products (Suárez-Eiroa et al., 2019). Education is meant to pass on knowledge, experiences, and values from generation to generation with the intention of ensuring human progress. Because of this, education must be moral to fortify sustainable development. Lack of education leads to less knowledge and diminished understanding of moral principles. Thus, people are tempted to resort to immoral measures and corruption is encouraged. Furthermore, a high level of corruption decreases the degree of economic and human development (Busoi, 2015). Education and technological innovations are the foundation of a social transition towards ecological behavior. It also contributes to the achievement of all sustainable development objectives (Dong et al., 2021).

Consequently, consumer behavior has a vital role in Romania's transition towards circular economy. Only if the consumers behave in line with the defined norms of the circular model, they may benefit of the concept's advantages. However, the biggest impediment is not the lack of desire to behave circular, but the absence of information. Therefore, consumers have to be educated for them to accept business models based on the circular economy (Lakatos et al., 2018).

Methodology

This paper is based on qualitative research. First, a survey, in the form of an online questionnaire, was addressed to people living in Romania. Respondents were chosen randomly. The number of respondents is 201. This research is ongoing, and this paper presents the intermediate results obtained.

The outcomes of the questionnaire were analyzed by a statistical software. Following, based on the documentary analysis, we defined characteristics of efficient education models and designed a framework based on specific targets of SDG 4 and SDG 12.

Results and discussion

The first objective of the study is to distinguish the respondents' level of knowledge and involvement in the CE. According to the survey, about 50 percent of the respondents are aware of the term circular economy, Figure 1. Generally, respondents over 45 years old are familiar with the term. The most informed age category, with 80 percent affirmative responses, is category 55 – 65 years old. Contrarily, the least informed age category is 34 – 44 years old.

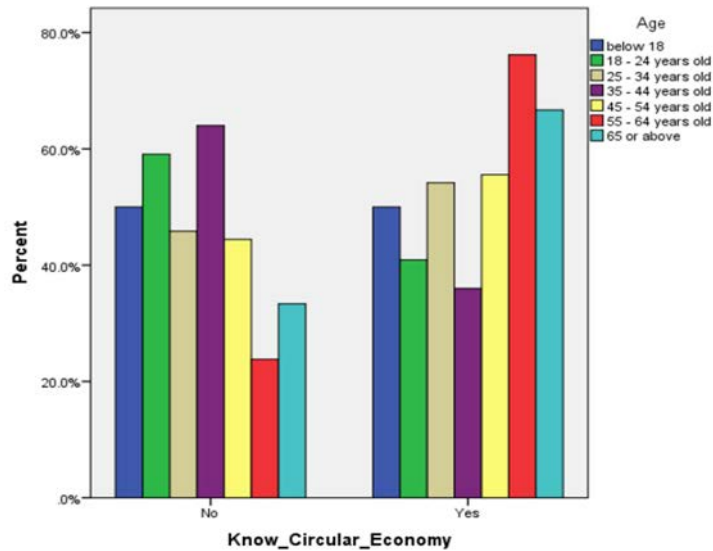


Figure 1. Knowledge of the term circular economy

In terms of involvement level, Figure 2, most of respondents are eager to adopt a circular behavior. Age category 55 – 64 years old has the highest level of involvement, not just knowledge. Even though age category 65 or above years knows the circular economy term, it has on average the lowest level of involvement and the most divided opinions. It can be noted that age categories with low degree of knowledge have also a lower degree of involvement. This, however, is not applicable for the youngest generation. Respondents under 18 years old are shown to have an extremely involved circular behavior, even if their knowledge level is average.

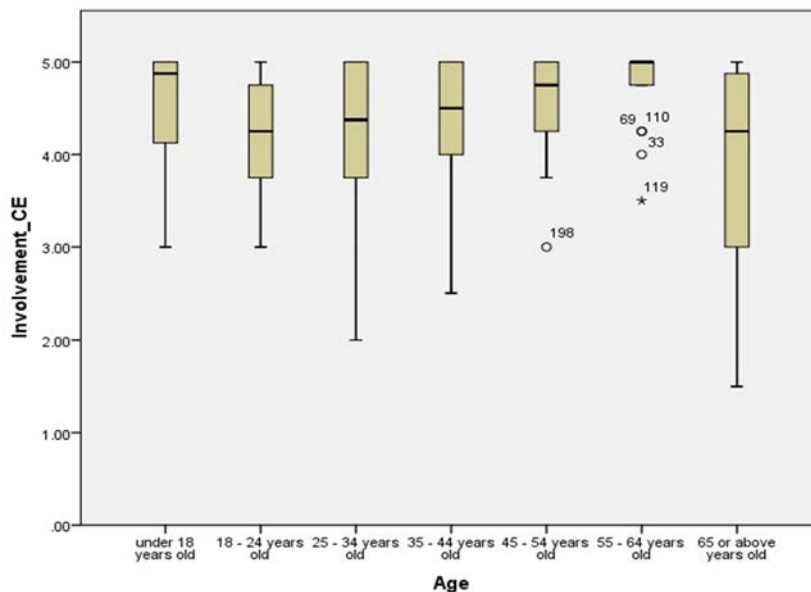


Figure 2. Involvement level in Circular Economy

From the length of the boxplots, a similar involvement level can be seen at the two youngest age categories. Even though these categories have an above average involvement level, about 50 percent of the respondents do not know the concept of CE. These categories together refer to Gen Z generation. Likewise, the next two age categories, 25 – 34 and 35 – 44 years old, have a similar involvement level. The means and the length of the boxplots are almost equal. These categories together refer to Millennials generation. In the same way, age categories 45 – 54 years old and 55 – 64 years old have similar involvement pattern. These age categories are Generation X. Consequently, the result indicates

similar involvement level across individual of the same generation. Accordingly, education models should be developed by considering the generation they are addressed to.

Concluding the obtained results can be systematized:

1. Education models must be developed over generations depending on age due to different involvement.
2. Motivating young people under the age of 18 to get involved in education to strengthen the great desire to apply the principles of the circular economy.
3. Application of CE norms in a unified way at the national level by observing the principles of sustainable development.
4. The concept of the circular economy is known by the respondents and there are different implications.
5. The CE concept is intended to be applied by the respondents. The respondents of the questionnaire are willing to join the effort to reduce waste and protect the environment. These objectives are among the objectives of the circular economy.

The characteristics of efficient education models

The second objective of the study seeks to identify the characteristics of efficient education models. The introduction of circular economy lectures in education institutes is essential to encourage the concept and to spread the principles. For the student to better understand the concept, the learning materials should be adapted to the field of study. Furthermore, the collaboration of the educational institutions with the government and practices stimulates the CE mindset and eco-responsible behavior (Serrano-Bedia and Perez-Perez, 2022). Hence, sustainable companies may offer internships or Open Days so that the students learn how the closed-loop model is implemented on different sectors and to see what actual impact consumers' action may have. However, a precondition for this scenario is that companies do have a responsible behavior. Some scholars point out that the role of private sector is even more important than the role of the education institutes in developing the concept (Kirchherr and Piscicelli, 2019). In addition, the use of games as educational tools can aid the recognition of relevant actions. The dedicated boardgame determine participants to become aware of problems such as solutions raised by the CE (Whalen et al., 2018). Beside the traditional courses, the introduction of more interactive learning methods was found effective. Digital tools were found to facilitate the collaboration and to encourage the transition towards circular practices. Moreover, digital options offer participants the possibility to learn at its own rhythm, at any time and place. However, the interactive approach is based on the partnership between public and private institutes (Türkeli and Schophuizen, 2019).

The third objective of this paper is to illustrate the relationship between education and circular economy, Figure 3. Undoubtedly, all targets of the SDG are critical for the sustainable development. However, we will focus on certain targets.

Responsible consumption, as part of SDG 12, is a requirement of the circular economy. Principles of the circular economy are elimination of waste and pollution, regeneration of nature and circularity of products and materials (Ellen MacArthur Foundation, 2013). These are expressed by target 5 of the SDG 12: "By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse". However, as it was discussed by scholars, these actions involve responsible consumers because they have to return the products. Consumers are prepared to return products only if they are aware of the benefits. Therefore target 5 of SDG 12, is directly influenced by target 8 of SDG 12: "By 2030, ensure that people everywhere have the relevant information and awareness for sustainable development and lifestyles in harmony with nature".

Moreover, a precondition of awareness and information existence is education. This builds a habitat where the circular economy can prosper. Individuals have to be educated from the role of the worker and citizen. Target 4 of SDG 4 refers to the position of the employee: "By 2030, substantially increase the number of youth and adults who have relevant skills, including technical and vocational skills, for employment, decent jobs and entrepreneurship". By having relevant skills and decent jobs, employees are motivated to engage in sustainable development. Companies have to invest in quality education methods for the staff to have knowledge in the circular economy (Schroeder, Anggraeni and Weber, 2019). Likewise, entrepreneurship can develop innovative technologies, which can help with interactive learning methods. Target 5 of SDG 12 that individuals is presence of skills, abilities, and capacities.

Similarly, the individual's position of engaged citizenship has an influence on SDG 12, target 8. Information and awareness can prosper only if the consumer acknowledge cultural diversity and peace because these are indicators of a united society. In this manner, consumers put aside individual benefits in favor of collective good and adapt a sustainable lifestyle.

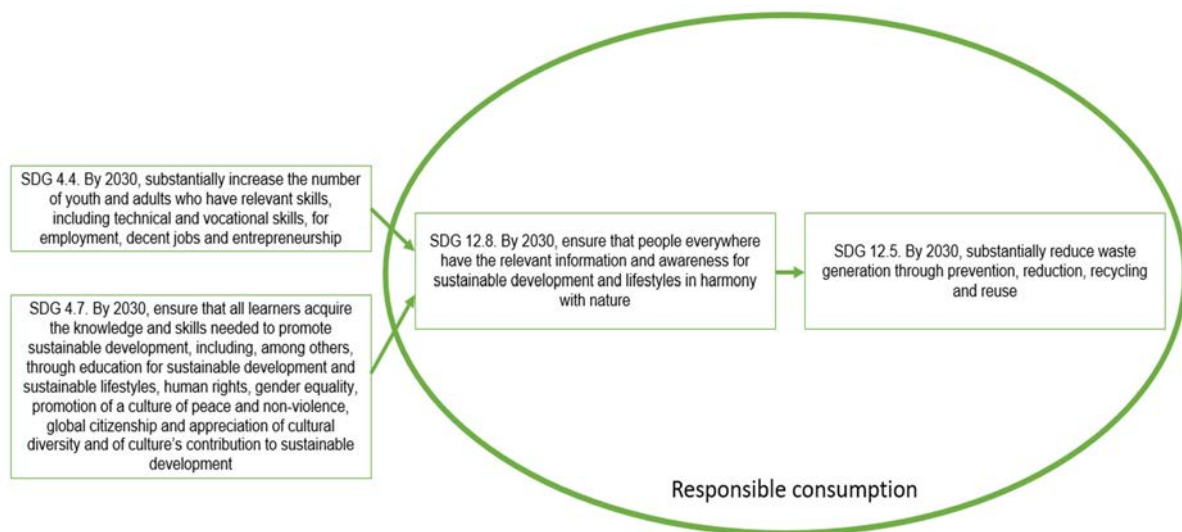


Figure 3. The framework of the relationship between targets of SDG12 and SDG4

Conclusions

The COVID-19 pandemic marks the beginning of a new era. Old challenges become more prominent and new mentalities arise. It is important to create a strong foundation in circular economy education in order to successfully implement to deal with the challenges that the future holds (Ambrus et al., 2018; Taucean et al., 2019). At the basis of implementing the closed-loop concept, information needs to be provided and awareness has to be raised. Sustainability and the circular economy must become a normality for all individuals (Cioca et al., 2019). Through this way, consumer can adapt responsible behavior.

Among the respondents an average level of knowledge was identified. Looking at the involvement level, we can draw the conclusion that individuals in Romania desire to have a circular behavior. These results reveal that there is interest, but also lack of education.

In terms of efficient education models, it has been identified that circular economy education models have to be interactive, adapted to the field of learning and based on collaboration between public and private institutions. Also, interactive methods such as games or digital tool have been proven successful. Furthermore, the respondents' involvement level can be categorized based on generation. Education models should consider which generation they are addressed to.

Last but not least, this study illustrated the relationship between targets of SDG 12 and SDG 4. Responsible consumption can be achieved only if consumer is informed and aware of the sustainable development and lifestyle. However, this implies that the consumer is educated as a worker and as a citizenship to behave responsible.

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RESEARCH ON IDENTIFYING THE DEFICIENCIES OF THE EXTERNAL COMMUNICATION PROCESS IN THE PRE-UNIVERSITY EDUCATION SYSTEM AND THE INFLUENCE OF THE PANDEMIC CONTEXT

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Abstract

Purpose – This paper considers the importance of external communication at the level of pre-university education institutions in Romania and aims to identify the aspects that disrupt the external communication process of educational institutions, on the one hand, and the aspects that have influenced the communication process during the pandemic and its consequences, on the other hand.

Methodology/Approach - The sampling method chosen was random sampling combined with purposive sampling for respondents from pre-university educational institutions. The questionnaire was applied to teachers in pre-university education.

Findings – The findings of this study revealed that the school formally establishes its communication relationship with its partners, but teachers are not specifically trained by the school through training programs. On the other hand, a problem of pressing topicality and complexity was not only the communication between the school and the higher institutions, but also that with the family or the community during the exceptional situation established in the context of the COVID-19 pandemic.

Research limitations/implications – The limitations of this research come from the fact that the answers collected are only from teachers whereas the family or community members' opinions are not captured.

Practical implications – These conclusions show that the school is the one that must reach an understanding of the different environments, experiences, values, cultures, religions and other factors that could affect the communication relationship with the family and the community. It is clear that the school staff also need communication skills for effective communication. The communication channel must be modern, efficient and as personal as possible.

Originality/value – The conclusions and recommendations may be used by representatives of educational institutions and could be part of the preparation for future potential crises and significantly contribute to improving management by developing effective communication skills.

Key words: communication, management, pre-university.

Introduction

All the changes that take place at the level of societies at political, social and economic level and the way they are reflected influence the activity of the educational institutions. Thus, they need to reconsider themselves from an institutional and organizational perspective, adopting a different approach, with greater openness and transparency towards civil society and partners.

The school is an open evolving system - a dynamic environment in which different expectations and roles of educational actors meet. As a result, each educational institution must have a communication strategy, built on the objectives and responsibilities of the school, as an essential part of the overall strategy. External communication should not be the exclusive task of the manager. It should be the product of teamwork of all school staff. The reality reveals that, at the level of pre-university education institutions, there is no department of communications with the external public. Therefore, this task is taken over by the principal, in the vast majority of cases, or by one of the teachers, usually a board member, who has basic communication skills.

In the context of the pandemic, the process of external communication at the level of the pre-university education system has been subjected to a new wave of challenges that, in fact, the whole society has faced. Under these conditions, educational institutions have had to resort to communication media that were not formalized before. Their potential has now been proven, and schools have taken advantage of these means of communication in order to keep in touch with students, their families or the community. In what concerns communication with the coordinating institutions, the already used communication channels were kept, to which the mass media were added.

Communication during the crisis was the most important role of the manager, through which he “guides people and helps them stay united” (Petriglieri, 2020). Marsen (2020) noted that crisis communication must address both crisis management during the crisis and reputation management after the crisis. Fernandez and Shaw (2020) recommended that academic leaders focus on best practices, try to see opportunities in crisis, communicate clearly, connect with others.

Following these events, the importance of a strategic plan for the communication process was highlighted together with the existence of a communication map to support the educational process, ensuring its continuity and eliminating most of the disruptive factors.

Methodology

Through the methodology used, this research achieves the theoretical foundation of external communication within educational institutions, starting from the hypothesis that there are aspects related to organizational communication that can be improved in order to increase their performance.

Researchers E. Rogers and R. Agarwala-Rogers (1980) consider communication as the fundamental process leading to the harmonization of an institution. Communication is the tool that has the role of relationship, institutional integration, control and coordination, adaptation of the organization to the external environment.

The research is based on three functions of communication that were subjected to this analysis: the function of regulating basic activities, the function of maintaining organizational communication and the function of innovation of organizational communication.

The regulatory function of the basic communication activities refers to the institutional organization and includes the instructions, procedures, reports developed to solve the organization's problems related to the communication process. The efficiency of the use of the regulatory function of the basic activities regarding communication is reflected in the smooth running of the activities specific to the organization and in ensuring the conditions necessary to increase the performance of school organizations.

The function of maintaining organizational communication has the mission of ensuring the functioning conditions of organizations in the relationship with the family and the community. This is manifested through the establishment of rules and policies of organizations.

The innovation function of organizational communication is extremely important to establish the school's long-term vision and strengthen the school's position in a highly challenging educational market.

The innovation function of organizational communication requires the institution to be open to the suggestions made by direct and indirect beneficiaries, the family and the community, and to put into practice the ideas that can contribute to increasing the performance of the communication process.

The general objective established was to identify the deficiencies of the communication process at the school level, with an impact on external communication.

The research sought to formulate some value judgments on the teachers' perception of the predominant functions of external communication at the level of pre-university educational institutions. Two specific objectives were derived from this objective:

SO.1 Knowing the teachers' perception about the predominant functions of external communication at the level of pre-university education institutions and

SO.2 Knowing the teachers' perception regarding the elements of external communication at the level of pre-university education institutions.

The instrument used was the questionnaire, structured on items with answers on a Likert scale, ranging from one to five, where number 1 represents "Total Disagreement" and number 5 represents "Total Agreement".

Internal consistency testing related to the considered variables was carried out using the Cronbach Alpha coefficient (Jaba & Grama, 2004). This set of variables is characterized by a Cronbach's Alpha factor value of 0.982.

Findings

The items were constructed in the form of statements with the help of which it is possible to quantify the importance given by teaching staff to the predominant functions of external communication at the level of pre-university educational institutions.

The items captured aspects related to:

- the quality of messages used in communication within the school-family-community relationship includes the characteristics of an effective message: clarity, coherence and completeness;
- the types of message transmission channels and whether new technologies are used to make information transmission time more efficient;
- the presence of feed-back in formal communication within the school-family-community relationship;
- message encoding/decoding activity; the ease with which the messages received by the school organization from the family and community are understood;
- the availability of sending/receiving messages by the school, family and community, in their capacity as the main subjects of communication, active during the act of transmitting/receiving information;
- formulating comprehensible messages for receivers;
- the environment provided by school organizations, favorable for communication within the school-family-community relationship and oriented towards the exchange of information;
- the school management support of the formation of an environment oriented towards the exchange of information;
- the efficiency of the communication channels used.

The responses were paired for analysis with the SPSS program.

The analysis showed that, at the level of communication functions, there are aspects that can be improved, especially in the function of maintaining organizational communication and the function of innovating organizational communication. Better results were obtained in the communication regulation function, being able to conclude that the school establishes its communication relationship with its partners at a formal level.

Another conclusion is that teachers are not specially prepared for the field of communication by the school through training programs. The respondents believe that, at the school level, there is an openness for external communication with the family and the community. On the other hand, the preference for the managers' formal side of communication with the family and the community was highlighted, although informal communication predominates at the school level.

Discussion and conclusions

During the pandemic, when the school was unprepared for such a situation, the school management was put to a test. Research carried out by specialists in education sciences from the University of Bucharest showed that teachers had to manage the situation without being supported (neither morally, nor materially). The differences between the two environments (urban/rural) deepened, the material aspect of the impossibility of investing in the technology to ensure the continuation of the educational process had undesired consequences. The function of maintaining communication was the one that did not work in optimal parameters, and the one of innovation needed financial support for the implementation of technologies. Managers now had an important role by involving the community in

supporting schools, and where this was achieved, schools received the necessary support much more quickly than from the coordinating institutions.

The pandemic crisis highlighted the importance of communication, and the reports that followed concluded that a rethinking of the communication strategy was needed. Thus, in the OECD guidelines, instructions are provided for the development of medium-term education strategies and, more broadly, for the contribution to strengthening the resilience of school systems for potential educational emergencies (OECD, 2020)

Broad communication of the implementation strategy provides clarity to all policy stakeholders about several central elements: the objectives, what needs to be done and

how different people can be involved to achieve them, the type of data that can help understand progress towards goals, and the timing and extent of action to be taken.

The OECD proposes four major directions of action for educational institutions, through which they can more easily manage crisis situations such as COVID 19. Analyzing these directions of action, one can see the importance of correct and coherent school communication with higher institutions, family and community.

The second direction is focused on the involvement of all interested parties in solving the crisis situation. The four proposed action steps assume types of communication initiated by the school and directed towards the interested parties, as can be seen in the figure 1.

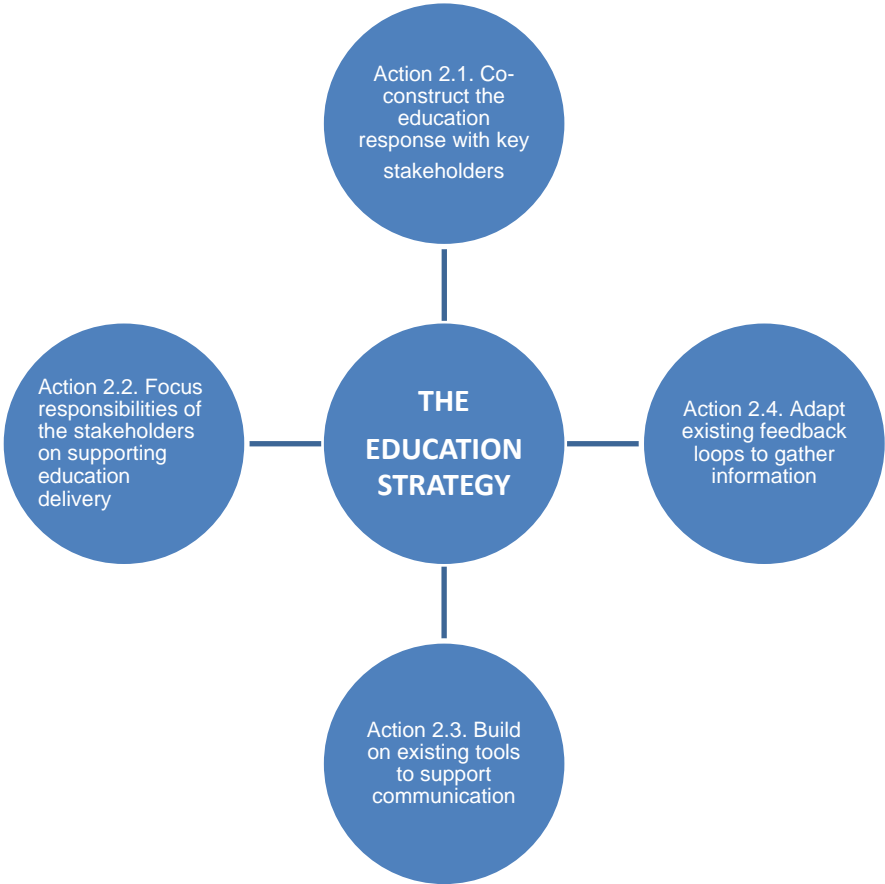


Figure 1 - The Education strategy - (adaptation according to OECD, 2020)

The first step is to build policies following a consultation process with key representatives such as trade unions, school principals, parents' associations, education and health specialists, through which to outline a solution adapted to the reality of the stakeholders. The second step refers to the involvement of all interested parties in the education process, which must be managed by the school, but also

supported by policies developed by higher fora, especially in areas such as health and safety. An important step, which fortunately has started to be implemented here, is building a system to maintain contact with partners, through existing communication platforms (applications, school portal, newsletters, etc.). A final step is the continuous modeling of the school's response according to the feedback of the interested parties, which involves maintaining communication, requesting periodic responses from partners with the aim of adapting existing strategies to their needs.

Teachers received help from:

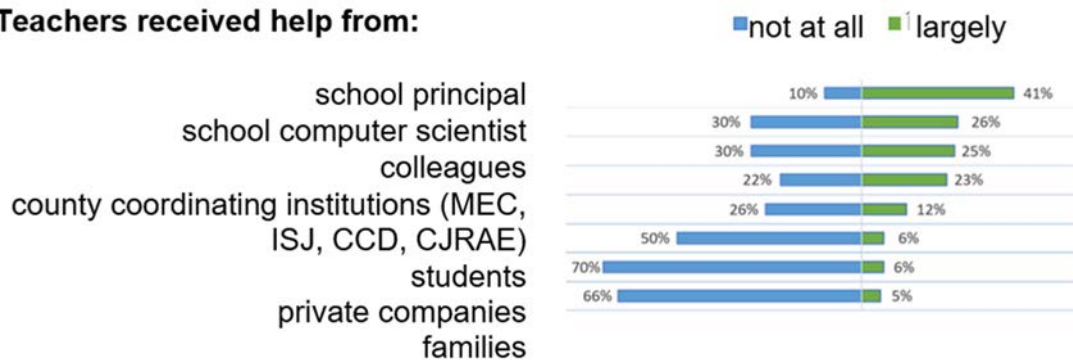


Figure 2 – Support received by teachers during the COVID-19 (adaptation according to University of Bucharest - 2021)

One of the conclusions we reached emphasizes the importance of family and community involvement, which can be achieved through clear and effective communication. Harris and Jones (2020) shared the same idea, arguing that “creating stronger links with parent/community groups to support families, youth and children is now a necessity to deal with the many challenges that COVID19 has created.” As shown in figure 2, community and family involvement were very low in Romania during the pandemic.

Although the majority of teaching staff showed interest in direct communication with quick and lasting effects, in times of crisis indirect communication is welcome and the current technique manages to keep the school connected with the family and the community. As a result, in many schools, various activities (sessions, classes, meetings, etc.) continued to take place online, although not frequently. The pandemic has forced educational institutions to take a big step towards technology. The Ministry of Education and many other institutions in the community have invested in connecting schools to the Internet, in equipping them with specific devices. Apart from this, teachers had to invest in their professional training in order to be able to use the platforms and programs necessary to carry out their activity. Families have begun to discover the advantages of using digital catalogs, a project also supported by the Ministry of Education and currently running only in pilot schools.

Clearly, the field of communication has undergone important changes at the level of educational institutions, which forces them to adopt a new communication strategy, adapted to new needs.

Considering all these aspects, we can extract the following recommendations:

- The need to draw up a communication map at the level of educational institutions;
- Management improvement by developing the school principals' communication skills;
- Clear and effective communication maintenance with the family and community, which will result in more prompt involvement in solving school problems during a crisis.

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TEACHING MANUFACTURING SYSTEMS CONCEPTS USING GAME-BASED LEARNING

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Abstract

Purpose – The paper presents a game-based simulation experiment for teaching concepts such as manufacturing systems to industrial engineering students. The entire approach was agile-based and used Scrum as a methodology to conduct students' activities.

Methodology/approach - The methodology proposed in the paper revolves around the concept of using Serious Games (SG) as an educational tool to study manufacturing systems. First, a SG definition model is presented. Second, the Lego-based simulation activity for students is described according to Scrum principles.

Findings – Given the complexity of manufacturing systems, students faced many decision-making challenges that made them understand the importance of their decisions in the outcome. However, the research showed that the simulation game offered a playful learning experience for the students enrolled in the course and we suggest that it can also be replicated in other domains.

Research limitations/implications – lack of collaboration with industries in developing Serious Games for engineering students to get a more hands-on approach when learning engineering concepts.

Practical implications – Due to the increased environmental unpredictability, many of the learning activities must also be carried out online. Game-based learning and Scrum offer such flexibility for students wanting to maintain part of their educational activities online.

Originality/value – Propose a practical exercise using Lego-based software to introduce students to the development of a manufacturing system and to give a closer look at how manufacturing concepts apply in real life.

Key words: manufacturing systems, Scrum, Serious Games

Introduction

This article presents the author's work to develop a gamification framework for conducting training activities for students enrolled in Economic Engineering in Electric, Electronic, and Energetic field, Faculty of Management in Production and Transportation, Politehnica University of Timisoara. Simulation games can be very effective in understanding manufacturing concepts and supporting the teaching process for engineering students.

Product development concepts such as Agile and Scrum methodology are also considered. Agile development concepts not only support the way students learn and work, but also encourage problem solving and teamwork skills. The course activities were guided in an Agile manner, offering students more autonomy and space to receive constant feedback on their work.

The Computer Assisted Manufacturing course is being taught during the second semester of the fourth year of the undergraduate Economic Engineering program in the Electric, Electronic, and Energetic field. The syllabus of this course approaches topics like Manufacturing Systems, Manufacturing Planning, Models and Modeling in Manufacturing, Artificial Intelligence in Manufacturing, Agile manufacturing, Optimization using Machine Learning/Artificial Intelligence Canvas and Flexible Manufacturing Systems. When learning and analyzing manufacturing systems, students are usually limited in learning the theoretical aspects of these concepts, as most industrial engineering courses are (Yiming, 2021). Project-based learning or PBL is considered a more suitable approach for industrial engineering

courses, as stated in (Gani, 2019), but researchers raised several concerns also regarding PBL (Yiming, 2021).

As Yiming (2021) considers, serious games (SG) for higher education have been shown to have a positive impact on the presentation of complex concepts to students enrolled in engineering programs. Serious games, also known as Edutainment or Game-Based Learning, are used to teach specific concepts through gamified exercises and simulations (Yiming, 2021); (Laamarti, Eid and El Saddik, 2014). SGs are attractive for young people and have a low risk of failure, since students practice in a virtual environment and for short periods of time. Many researchers have already developed models and frameworks to analyze the opportunities and limitations of educational games, highlighting the methods in which these games can be structured and used in a way that supports effective learning (Carvalo et al., 2015). Among the perspectives of defining the concept of SG in the research field, a common opinion is that SGs are games with several other purposes in addition to providing entertainment or fun for the user (Laamarti, Eid and El Saddik, 2014). In Figure 1, the author presents the concept of SGs as a system based on three interconnected pillars, Learning & Teaching, Gaming and Simulation, centered on the learner, and clearly showing the fact that training simulation, simulation games and Edutainment are not interchangeable concepts. The Learning&Teaching component addresses, on the one hand, the point of view of the learners and on the other hand, the point of view of the instructor.

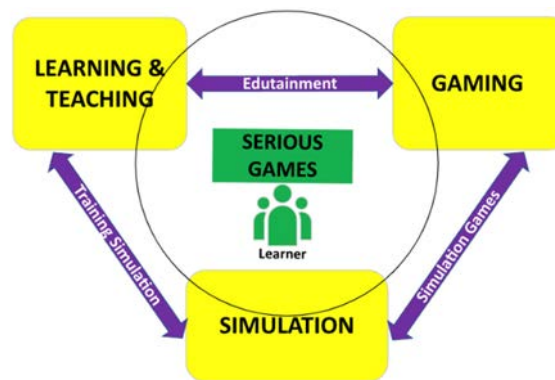


Figure 1. Serious games definition model

Based on the SG's definition model from Figure 1, in the present paper the following research questions are addressed:

RQ1: What kinds of skills are students supposed to develop when using gamification in their learning activity?

RQ2: Can agile methodologies such as Scrum, improve efficiency and communication in teams rather than when using traditional project management techniques?

RQ3: How should a serious game be designed to efficiently give engineering students a proper mix between learning and fun?

Game-like activities in Agile Engineering Education

We can approach the concept of Agile by considering it as a philosophy that supports flexibility, adaptability, and innovation. Over the past few years, agile has shown its significant support in many other areas in addition to software development, where it has its roots (Buciuman, 2020). Agile methodologies are also known as flexible product development. Unlike traditional project management techniques focused on following the initial plan, agile or flexible methods use several techniques that allow for a low cost of change (Buciuman, Izvercianu and Seran, 2012). For education, this flexibility can be related to the teacher's ability to change his learning techniques and adapt the approach to meet the diverse needs and abilities of students (Chun, 2004).

For students studying manufacturing and production systems, it is very common to face certain issues in understanding concepts such as design or modelling when using traditional lectures and theoretical explanations (Lugaresi, Frigerio and Matta, 2020).

Gani (2019) summarizes some critical issues that need to be addressed in Engineering Education:

- Technical courses are usually not related to industry topics;
- Students lack practical experience, teamwork experience, and communication skills;
- Teaching and learning methodologies need to be more student oriented;
- Students lack knowledge on the social, legal, and environmental impact of modern engineering technologies.

Many of the activities in the Computer-Assisted Manufacturing course are project-based and can be approached using agile practices. These project activities can be designed as serious games that can provide students with practical application and problem solving skills. Stier (2003) considers that laboratory projects or other practices that offer students hands-on experiences of industry situations can also be of great value to students studying manufacturing concepts.

According to Yiming (2021), serious games have already been applied for production planning in industrial engineering. As benefits of using SG for engineering students, Yiming (2021) highlights:

- practicing the theoretical concepts in a simulated, and safe environment;
- developing skills such as teamwork, leadership, and communication;
- the opportunity to clearly see the impact of their decisions on the outcome.

Using Lego for educational purposes is presented in (Hussain, Lindh and Shukur, 2006) and is based on the belief that students with a technical background that perform better in mathematics tend to be more engaged and successful when learning with Lego training. Yiming (2021) lists several engineering subjects where Lego Mindstorms has been increasingly used as an educational tool, but also states that there are not many approaches of using Lego for manufacturing systems courses.

Methodology

This paper describes a teaching approach developed during the Computer-Assisted Manufacturing course. Students enrolled in the course are asked to use Lego Studio Designer software to design a production system based on the specifications provided by the teacher. As a prerequisite, students should have the appropriate skills to approach practical engineering problems, although most of the courses they take during the four years at the university are standalone courses. For this reason, it was important to offer a more flexible approach that could provide students with the opportunity to nurture teamwork and problem-solving skills and face production issues in a safe and controlled environment.

The manufacturing project was mainly student driven. Students carried out their activities iteratively following the principles of agile Scrum methodology. The project goal was to design a production system in a plant layout with all the features involved in the process. During the development phase, students were asked to find the best configuration of features in terms of quality, meeting the definition of done inflicted by the Scrum methodology. The aim was to teach students the process planning using Lego blocks in a virtual environment.

As in any other type of project, a Scrum project starts by defining the objectives and features of a new product. The resulting list of features is called Product Backlog. Development is iterative and allows for constant inclusion of feedback from one iteration to another. These iterations are called Sprints (Buciuman, 2020). The Scrum framework consists of (Buciuman, Izvercianu and Seran, 2012), (Pejcinovic, Wong and Bass, 2019):

- **A set of roles:** Scrum Master, Product Owner, Team Member;
- **Four types of meetings:** Sprint Planning, Daily Stand-Up, Sprint Review, Sprint Retrospective;
- **Artifacts:** Product Backlog, Sprint Backlog;
- **Commitments:** refers to the need of the Scrum Team to support each other and to pursue a common goal;

Figure 2 illustrates the Scrum framework in practice with all the specific elements listed above. A more detailed explanation of all Scrum features and artefacts can be found in (Schwaber and Sutherland, 2020).

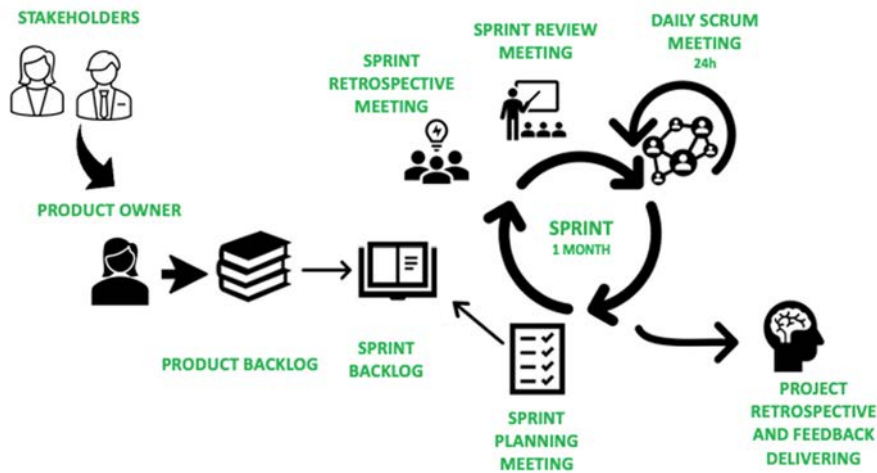


Figure 2. Scrum framework

The person in charge with creating and prioritising the backlog is called the Product Owner. The Development Team represents another category of roles in Scrum. At the beginning of every sprint, Scrum Teams will create a Sprint Backlog. The Sprint Backlog is a list of features that the team needs to complete during a Sprint. Teams are completely in charge of the Sprint Backlog. As stated in (Buciuman, 2020), the Scrum framework can be used as an effective tool for conducting educational activities.

The first phase of the project began with the presentation of the features of the future product. The presentation was made by the teacher, who in this case takes over the role of the Product Owner. The project the students from the 4th year were supposed to approach consisted of the construction of a manufacturing unit. The whole project was Lego-based and was developed using Lego Studio 2.0.

Students were divided into Scrum teams of five people each. To have a clear overview of Scrum artefacts, every team used a Kanban board. For every team, one of the students took the role of the Scrum Master and she was in charge of keeping the Kanban board up to date and to ensure that all Scrum-specific meetings are documented, and that work is properly assigned from one Sprint to another. The Kanban board consists of a set of columns labelled To-do, In Progress and Done. Each User Story from the Sprint Backlog is assigned to one team member and is placed in the To-Do column. After the work is completed, the User Story is moved to the Done column. At any given time, every team member is aware of the status of every feature in the Sprint Backlog. In Figure 3 is an example of a Kanban board layout developed using Miro.

There were situations where students did not attend any of the Daily Meetings, but this was highlighted by the fact that they did not complete the activities they assumed they would do during the Sprint. The topic was discussed during the Sprint Retrospective Meeting. During the Retrospective Meeting, they managed the situation by themselves, and this was a great opportunity to provide students with more control over their learning process. The teacher also provided feedback to each Scrum team, regarding the quality of the completed User Stories, the quality of the Kanban board, and on how the team worked during the Sprint.

Students had seven weeks to complete the project. Each Sprint lasted one week. The first couple of Sprints were the most challenging, because students did not yet have enough experience to effectively estimate the work they can do during a Sprint. This is a process that self-regulates as the Sprints progress, with students learning to appreciate the work that the team can complete in a Sprint more efficiently and properly. At the end of every Sprint, students delivered an increment of the manufacturing process they had to design. The increment consisted of basic elements of a production system, such as conveyors or robotic cells Lego based, which in the end materialized as a production sequence. Figure 4

presents a robotic process and workspace, and Figure 5 shows a robotic assembly cell, all representing increments from different Sprints.

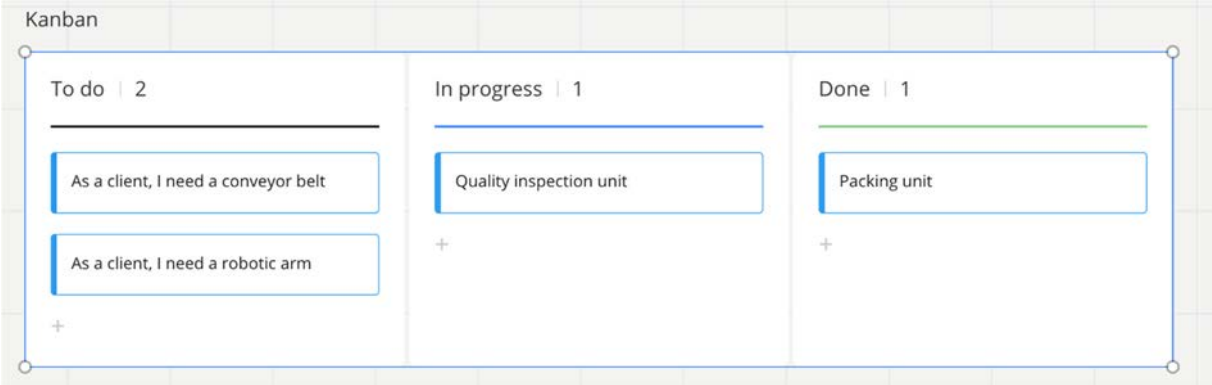


Figure 3. Example of a Miro Kanban board

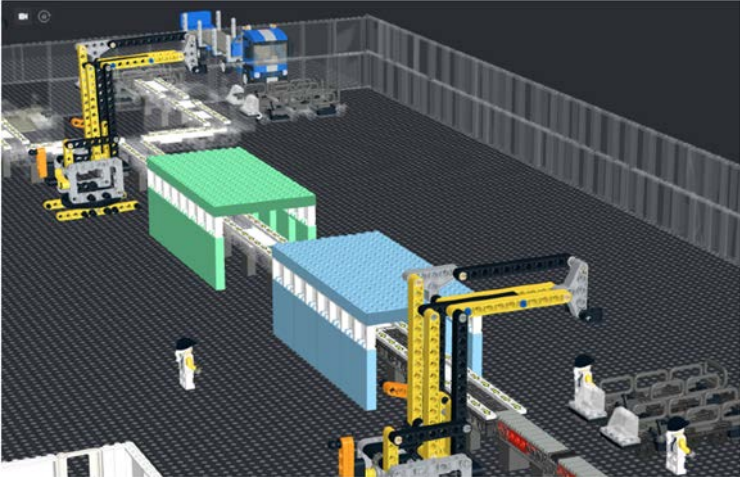


Figure 4. Robotic process and workspace in Lego Studio 2.0

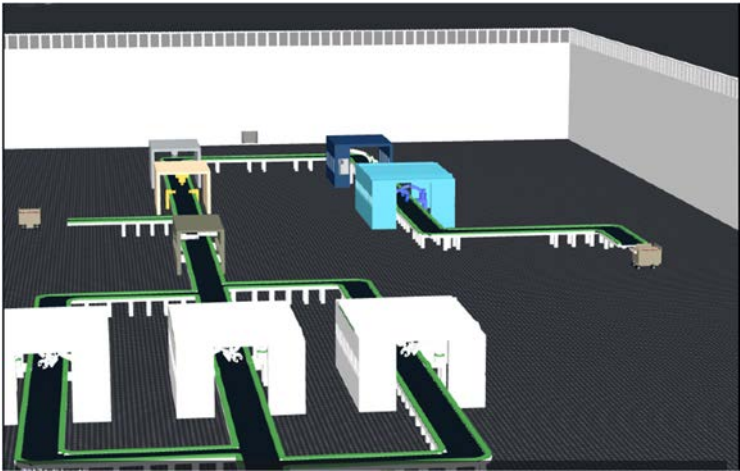


Figure 5. Robotic assembly line in Lego Studio 2.0

Working in short time intervals, students received rapid feedback on their work and became more aware of the impact that every member of the team has on the outcome. Some of them missed several Daily Meetings and this led to communication issues within the team, but which could be managed during the

Sprint Retrospective Meetings. The students had the opportunity to reflect on how they performed both as a team and individually.

Discussion and Conclusions

The first objective of the paper was to identify the skills students can develop using game-like activities when studying engineering concepts. Following the teacher's observations and the feedback received from students, using Lego as a main tool for understanding manufacturing concepts, it was easier for students previously designing other Lego projects and they tended to be more engaged. The general attitude was positive. By working in Sprints, problem solving skills and improvement in decision-making could be quantified by measuring specific Key Performance Indicators (KPIs) such as #Team effort, % Flexibility, or % On-time Delivery. The trend for these KPIs showed better results from one Sprint to another.

Being a transparent process, Scrum facilitated a clear overview of the process and on the activity that all students performed during a Sprint, thus motivating students to be aware of their tasks.

Referring to the second research question, we saw that the agile teaching approach involved a lot of adaptability and allowed both students and teachers to be more committed and to embrace change. Communication with other team members and with the teacher Product Owner was easy-going because of the frequent meetings Scrum implies. It should be mentioned that some of the students worked for the first time in real teams and were comfortable talking about their approaches during the Sprints and about criticizing or, in contrast, appreciating the work of other team members.

There are many success factors that the literature has drawn for designing and developing serious games (Laamarti, Eid and El Saddik, 2014). It is important to mention that educational games have a higher chance of being accepted by teachers if they follow the curriculum and fall within the time frame. The balance between the fun and educational part of a serious game might be subjective. It is important that the game keeps its entertaining part but also fulfills its educational objective, and probably the serious part tends to take over, but we must not forget that the educational purpose can be reached right through the fun component itself. The experience of using Lego to teach manufacturing systems brought new learning experiences for both students and teachers. Considering that the activities were carried out using Scrum, the game-like activities that the students carried out implied a lot of decision making, adaptability, and teamwork spirit. When evaluating this assignment, students stated that they enjoyed integrating gaming into their engineering education and that this made the concepts learned seem more tangible and more accessible. Some of them mentioned that at first, they felt overwhelmed because they did not have much time to learn how to use Lego Studio before the first Sprint and this made them feel anxious at first.

For future experiences in addressing the field of manufacturing systems using serious games, several elements will be considered to improve the way in which the productivity and sustainability of the manufacturing systems students develop are measured.

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HOW CAN ACADEMIC SPIN-OFFS IMPROVE THEIR MARKET PERFORMANCE BY TAKING INTO CONSIDERATION THE VOICE OF THEIR CUSTOMERS?

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Abstract

Purpose – The research objective is to demonstrate that Kano with HWWP model can improve the market performance of academic spin-offs (AS) by translating the voice of the customer into design priorities.

Methodology/approach – The paper presents the methodological steps for customer needs assessment on a AS case study from Romania. A questionnaire with 12 customer features was applied on 64 clients. Because the features of the product are agglomerated in the quadrant, the the uniformity test of the HWWP model is applied in order to show which product characteristic should be improved first.

Findings – The paper provides new insights for academic spin-offs in Romania by developing new strategies in market orientation in order survive.

Research limitations/implications – The limitation is given by applying the method on a single case study.

Practical implications – The study can provide guidance's for universities, research institutes in order to integrate this method in the training courses held for researchers, students.

Originality/value – The novelty of the paper is given by Kano and HWWP methodology which can improve the survival of the academic spin-off, helping the innovative venture to succeed on the market, by adapting the product to the customer needs.

Key words: academic spin-off, market orientation, HWWP model

Introduction

Market orientation has been long considered as a key factor for business success (DeLuca et al., 2010) since it involves the concept of delivering superior value to the customer (Han et al., 1998). A definition of market orientation is given by Slater and Narver (1994) which involves three dimensions: customer orientation, competitor orientation and inter-functional coordination. Han et al. (1998) showed that market orientation facilitates an organization's innovativeness, which, in turn, positively influences its business performance.

Buratti et al. (2021) argue the relevance of being market oriented when exploiting new innovative technologies for commercial profit, highlighting the specific case of university spin-offs or how they are also called, academic spin-offs (AS). But what are these ASs and what is the value they provide to the current marketplace? Academic spin-offs are marking the future of sustainable regional development (Vac and Fitiu, 2017) because they have a unique opportunity to market R&D outcomes from university labs into real use. Their creation is encouraged by governmental spheres (especially in the European Union) since they represent a very important technological transfer mechanism from scientific research towards product design and final commercialization, increasing regional competitiveness (Mihali et al., 2022).

But despite being „a driver of local economic development, their growth is slow, especially for companies based in the EU” (Buratti et al., 2021). Hesse and Sternberg (2017) consider as a main cause for their performance limitations the way they are managed. As they suggest, these spin-offs are run more as research laboratories. Also, their founders take decisions based on prejudices or feelings rather than on

objective data from potential customers (Robets, 1990) and are obsessed to prove their scientific technology than to meet market needs. Rasmussen et al. (2011) also conclude that academics, despite being innovation driven in their research domain, they lack the skills to identify opportunities in the market context. The consequences are failure to use the added value for commercializing technological innovations or failure to direct attention towards potential customer needs (Würmseher, 2017). Moreover, in a study on Eastern European countries with statistical research on Romanian ASs, Mihali et al. (2022) suggest that the higher the number of academics in an academic spin-off, the higher the failure to succeed in the market due to the same lack of market orientation.

Thus, market orientation of the academic founder positively affects the business (Grandi and Grimaldi, 2005) and might be a source of competitive advantage over time (Buratti et al., 2021). If not acquired, the lack of market knowledge is an obstacle for growth (Van Geenhuizen and Soetano, 2009).

The present paper aims to provide a methodology for academic spin-offs to force them change their perspective from research towards their customer needs. The first step is to focus on product features and understand customers' needs regarding them. Because academic entrepreneurs in a AS are primarily researchers with technical background, providing them with a methodological model is key for its acceptance. Therefore, the Kano model with its refinement – the HWWP (Health Weapon Wealth Prospect) model has been selected for introducing customer orientation. Based on Pugna et al. (2021)'s elasticity curves in the HWWP model, the academic entrepreneur has all the necessary data to understand the voice of the customer and direct the focus on the commercial context.

In the next section the Kano and HWWP model are explained together with methodological steps for customer orientation, followed by a case study of a Romanian academic spin-off which used this methodology to develop its products in accordance with market requirements. Finally, conclusions are outlined.

The Kano model and the HWWP model

Despite its foundation more than two decades ago, the Kano model is an important tool for assessing the voice of the customer for new offers or for improving existing ones. Kano et al. (1984) envisages to explain the roles each product or service feature play for potential or current customers. With the help of a specific Kano questionnaire, each feature is evaluated as belonging to one of six different Kano categories, each with its specificity and strategic potential: attractive, one-dimensional, must-be, indifferent, reverse and questionable.

Because the Kano model had some disadvantages largely discussed by scholars, new refinements appeared. One of them is the HWWP (Health Weapon Wealth Prospect) model, proposed by Potra et al. (2017) for new innovative products or services. With its four dimensions based on customer satisfaction and importance ratings variables, with suggestive names like: Health Weapon Wealth and Prospect, each feature or customer requirement is visually allocated for strategic decision making (as can be seen in Figure 1. The initial HWWP model).

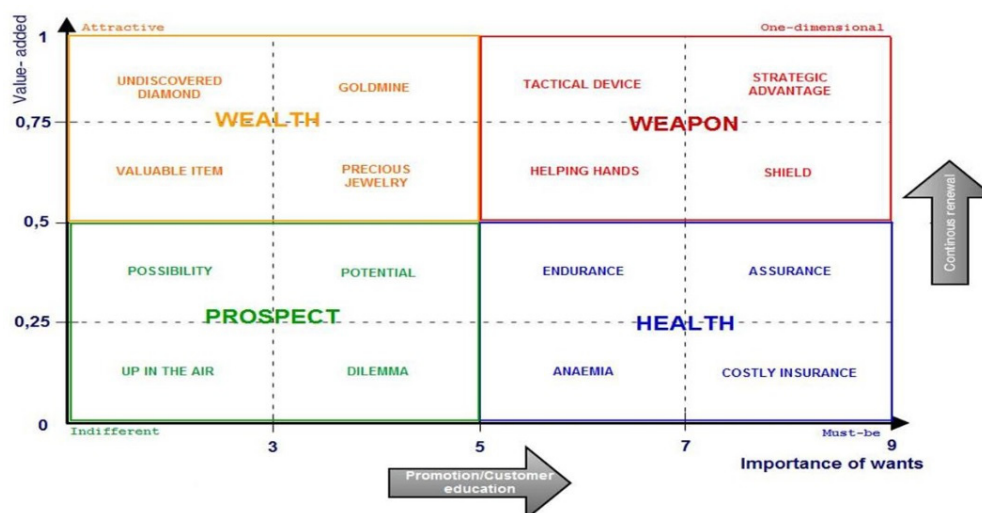


Figure 1. The initial HWWP model (Source: Potra et al., 2017)

The four dimensions have each four subdomains in which customer requirements can be found for a thorough differentiation between them. Nevertheless, the HWWP has been also improved by Pugna et al. (2021) with the help of elasticity curves when the linear model is not an option. In this way, the lifecycle of all features can be strategically assessed for managerial decision-making.

Proposed methodology for customer orientation

In Figure 2 the methodology of the present paper is presented. The steps academic entrepreneurs need to follow are explained and offer guidelines for changing their perspective towards their customer needs with the help of a sound and proven model.

As first phases, the product or service academics want to analyze or improve needs to be selected. Existing and new functionalities or also called features (customer requirements/quality attributes) need to be delineated because managers have to assess the existing functionalities added value and importance for existing customer but also propose new functionalities for product improvement which will trigger customer delight.

A basic knowledge of the Kano and Importance questionnaire is necessary for their adequate construction. All information is provided in literature (Sauerwein et al., 1996) for the construction and evaluation of questionnaire responses.

For the HWWP visual representation, Potra et al. (2017) present the way in which the two variables are computed. In Figure 2 presents the methodology steps for customer needs assessment.

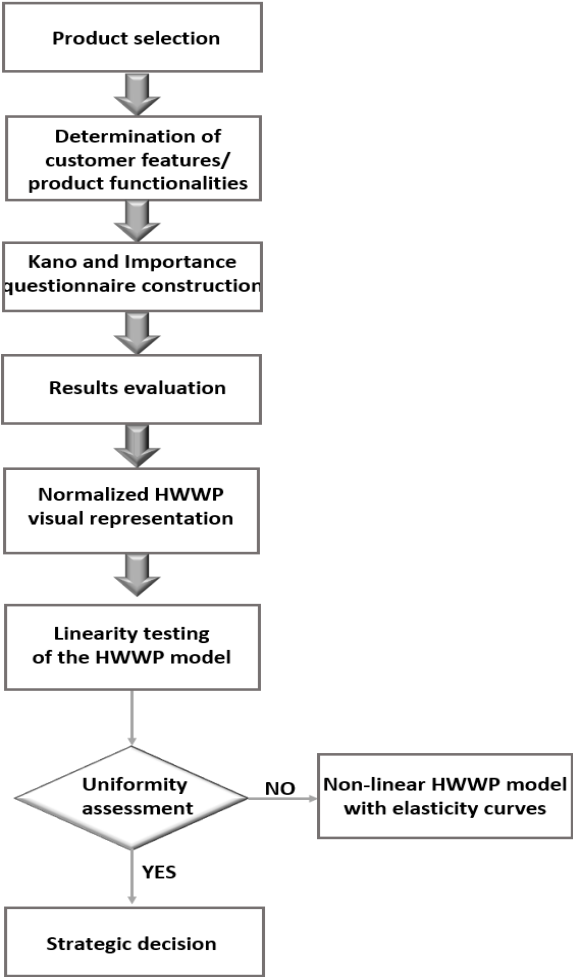


Figure 2. Methodology steps for customer needs assessment

If the methodology seems difficult to understand without statistical knowledge, the AS management team can stop at the fifth step when visually representing customer requirements in the HWWP classical

model. The linearity testing provides only a more thorough viewpoint in special cases when two or several features are very close to one another in a subdomain of the HWWP model. By using a statistical linearity test like Rayleigh or Chen and Hu test, the management team can assess if they need a non-linear HWWP model or the data is relevant enough in the linear one. Based on this last data, a strategic decision can be adequately taken.

To prove the methodology is not difficult to implement in an academic spin-off, the next chapter proposes a case study analysis.

Proofing the methodology works for academic spin-offs. A Case study from the Western part of Romania

The selected spin-off is a company active in the renewable energies industry from the Western part of Romania. Established in 2017 by a professor in the Timis county, it produces pallets and lighters. Financial details can be seen in Table 1.

Table 1. AS1 details from Timis county (Source: www.mfinante.ro)

Firm age (year)	Size (employees)	Market performance (turnover)
1 (2017)	1	0
2 (2018)	4	0
3 (2019)	3	155.000
4 (2020)	0	90.200
5 (2021)	2	10.000

The first step in improving its products has been to select the product they wanted to focus upon, namely the lighters. Then, for the determination of customer features, the authors have discussed with the company managers and delineated 12 functionalities presented in Table 2 for potential improvement purposes.

Table 2. Improvement functionalities for lighters and their description

Nr. crt.	Customer features/functionalities	Description
1	Recyclable polyethylene packaging	Customers usually desire recyclable packaging and the polyethylene maintains a correct humidity degree of the product
2	Wood imitation	The unrooted lighters are light colored and the rooted ones are darker. For burning in the fireplace, they are visually more appealing in a color which imitates wood
3	Rectangle shape of the product	
4	Calorific power	A higher calorific power is more demanded
5	Nice fir smell	When burning, such lighters will give off a pleasant smell of fir (the classical version has no smell or even a bad smell)
6	No dirt/ash	After burning the lighter in the fireplace or in the central heating device, the client wishes the ash level to be low to avoid additional dirt
7	Resistant	A better resistance of the product is desired, this means the lighters should remain in one piece and not be easily breakable
8	Small package	Lighters could be bought in smaller packages of 5 pieces or more
9	Home delivery	The products could have the home delivery option when ordered
10	Buy back option	At 5 kg of customer waste (corn cobs, straw...) 1 kg of briquettes is received
11	Card payment option	When paying the order, the customer could have the possibility to pay cash but also by card
12	Delivery in 24h	After ordering the products, the customer should expect them to be delivered in one day (very fast for the current situation)

For the third step, the authors have constructed a Kano and Importance questionnaire totaling a number of 24 questions (12 questions with functional and dysfunctional form for the Kano questionnaire and 12 importance assessment questions). After discussing with 64 clients and completing the questionnaires, the evaluation of results can be seen in Table 3.

Table 3. The Kano and importance questionnaire results

no.	Functionality	A	O	M	I	R	Q	Total	Kano category	Importance	Potential added value (CS)
1	Recyclable packaging	13	8	5	35	2	1	64	I	0.43	0.34
2	Wood imitation	29	5	1	22	1	6	64	A	0.47	0.59
3	Rectangle shape	7	5	2	32	11	7	64	I	0.39	0.25
4	Calorific power	22	26	6	8	0	2	64	O	0.73	0.77
5	Nice fir smell	31	14	1	13	2	3	64	A	0.48	0.76
6	No dirt/ash	4	35	9	12	0	4	64	O	0.71	0.65
7	Resistant	12	26	14	9	1	2	64	O	0.72	0.62
8	Small package	18	11	4	22	7	2	64	I-A	0.47	0.52
9	Home delivery	33	16	2	10	1	2	64	A	0.59	0.8
10	Buy back option	30	18	3	12	0	1	64	A	0.6	0.76
11	Card payment option	17	22	8	14	3	0	64	O-A	0.61	0.63
12	Delivery in 24h	26	20	3	13	2	0	64	A-O	0.57	0.74

The recyclable packaging together with the rectangle shape and small package options seem indifferent to customers. If they are not difficult to implement in the final product, the management team could try to include them in their final offer. The wood imitation, nice fir smell, home delivery and buy back options are attractive for customers, providing a nice surprise if met. At least two of them need to be implemented for a competitive advantage. But the calorific power, no dirt/ash, resistance and card payment options are one-dimensional, expected features customer expect to receive. Thus, these functionalities need not only to be implemented but the company has to perform them at the highest standards to win against competition.

The normalized HWWP visual model in Figure 3 presents all the 12 functionalities as they have been computed by using the voice of the 64 customers in one of the four quadrants.

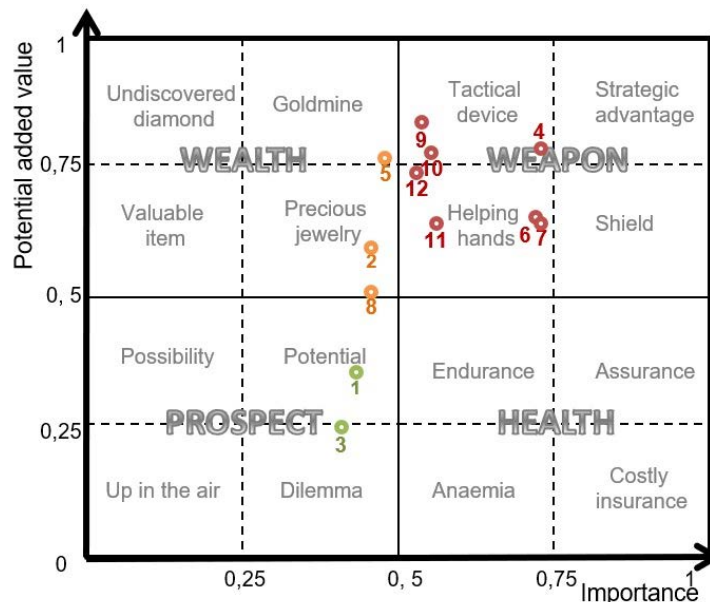


Figure 3. The normalized HWWP model for the 12 lighter proposed functionalities

Due to the fact that the points associated with the 12 functionalities are agglomerated in the weapon quadrant, we need to test the uniformity of the HWWP model as argued by Pugna et al. (2021) with

the help of the Rayleigh or Chen and Hu test. In the current case study we have chosen to use Rayleigh test. The computed value of the test is 11.82697 > 2.853 (the value of n=12 from Table 4).

Table 4. The uniformity test for the HWWP model in the case of the 12 customer features

n	α: 0,50	0,20	0,10	0,05	0,02	0,01	0,005	0,002	0,001
6	0,734	1,639	2,274	2,865	3,576	4,058	4,491	4,985	5,297
7	0,727	1,634	2,278	2,845	3,627	4,143	4,617	5,181	5,556
8	0,723	1,631	2,281	2,899	3,665	4,205	4,710	5,322	5,743
9	0,719	1,628	2,285	2,910	3,694	4,252	4,780	5,430	5,885
10	0,717	1,626	2,285	2,919	3,716	4,289	4,835	5,514	5,996
11	0,715	1,625	2,287	2,926	3,735	4,319	4,879	5,582	6,085
12	0,713	1,623	2,288	2,934	3,750	4,344	4,916	5,638	6,158
13	0,711	1,622	2,289	2,937	3,753	4,365	4,947	5,685	6,219
14	0,710	1,621	2,290	2,941	3,774	4,383	4,973	5,725	6,271
15	0,709	1,620	2,291	2,945	3,784	4,398	4,996	5,759	6,316
16	0,708	1,620	2,292	2,948	3,792	4,412	5,015	5,789	6,354
17	0,707	1,619	2,292	2,951	3,799	4,423	5,033	5,815	6,388
18	0,706	1,619	2,293	2,954	3,806	4,434	5,049	5,838	6,418
19	0,705	1,618	2,293	2,956	3,811	4,443	5,061	5,858	6,445
20	0,705	1,618	2,294	2,958	3,816	4,451	5,074	5,877	6,469
21	0,704	1,617	2,294	2,960	3,821	4,459	5,085	5,895	6,491
22	0,704	1,617	2,295	2,961	3,825	4,466	5,095	5,908	6,510
23	0,703	1,616	2,295	2,963	3,829	4,472	5,104	5,922	6,528
24	0,703	1,616	2,295	2,964	3,833	4,478	5,112	5,935	6,544
25	0,702	1,616	2,296	2,966	3,836	4,483	5,120	5,946	6,559
26	0,702	1,616	2,296	2,967	3,839	4,488	5,127	5,957	6,573
27	0,702	1,615	2,296	2,968	3,842	4,492	5,133	5,968	6,586
28	0,701	1,615	2,296	2,969	3,844	4,496	5,139	5,975	6,598
29	0,701	1,615	2,297	2,970	3,847	4,500	5,145	5,984	6,609
30	0,701	1,615	2,297	2,971	3,849	4,504	5,150	5,992	6,619
32	0,700	1,614	2,297	2,972	3,853	4,508	5,159	6,006	6,637
34	0,700	1,614	2,297	2,974	3,856	4,516	5,168	6,019	6,654
36	0,700	1,614	2,298	2,975	3,859	4,521	5,175	6,030	6,668
38	0,699	1,614	2,298	2,976	3,862	4,525	5,182	6,039	6,681
40	0,699	1,613	2,298	2,977	3,865	4,529	5,188	6,048	6,692
42	0,699	1,613	2,298	2,978	3,867	4,533	5,193	6,056	6,705
44	0,698	1,613	2,299	2,979	3,869	4,536	5,198	6,064	6,712
46	0,698	1,613	2,299	2,979	3,871	4,539	5,202	6,070	6,721
48	0,698	1,613	2,299	2,980	3,873	4,542	5,206	6,076	6,729
50	0,698	1,613	2,299	2,981	3,874	4,545	5,210	6,082	6,736
55	0,697	1,612	2,299	2,982	3,878	4,550	5,218	6,094	6,752
60	0,697	1,612	2,300	2,983	3,881	4,555	5,225	6,104	6,765
65	0,697	1,612	2,300	2,984	3,883	4,559	5,231	6,113	6,776
70	0,696	1,612	2,300	2,985	3,885	4,562	5,235	6,120	6,786
75	0,696	1,612	2,300	2,986	3,887	4,565	5,240	6,127	6,794
80	0,696	1,611	2,300	2,986	3,889	4,567	5,243	6,132	6,801
90	0,695	1,611	2,301	2,987	3,891	4,572	5,249	6,141	6,813
100	0,695	1,611	2,301	2,988	3,893	4,575	5,254	6,149	6,822
120	0,695	1,611	2,301	2,989	3,896	4,580	5,262	6,160	6,837
140	0,695	1,611	2,301	2,990	3,899	4,584	5,267	6,168	6,847
160	0,695	1,610	2,301	2,991	3,900	4,586	5,271	6,174	6,855
180	0,694	1,610	2,302	2,992	3,902	4,588	5,274	6,178	6,861
200	0,694	1,610	2,302	2,992	3,903	4,590	5,276	6,182	6,865
300	0,694	1,610	2,302	2,993	3,906	4,595	5,284	6,193	6,879
500	0,694	1,610	2,302	2,994	3,908	4,599	5,290	6,201	6,891
∞	0,6931	1,6094	2,3026	2,9957	3,9120	4,6052	5,2983	6,2146	6,9078

Discussion and conclusions

In conclusion, the uniformity hypothesis is rejected and a generalized HWWP model with elasticity curves is recommended (Pugna et al., 2021). The new approach offers a supplementary partition with 7 meridian elasticity curves (Figure 4) to assess the potential value each customer feature will provide to the analyzed product. The term elasticity is related to the sensitivity to customer demands. The greater the elasticity of a functionality, the more value it provides to the product and the company. Our two variables, namely the potential added value and the importance, are divided by a diagonal (a point of unit elasticity- curve 4) equal to 1. All data above the diagonal is considered as elastic and the below data as inelastic. As expressed already by Pugna et al. (2021), "In the elastic region, any small change in a quality attribute positively or negatively influences customer satisfaction, unlike in the inelastic region, where a value improvement has a reduced influence on customer satisfaction."

The elasticity curves provide relevant information for decision making by taking into consideration the voice of the potential customer and translating it into prospective strategies. For example, the feature 6 (no dirt/ash) and 7 (resistant) are similar, both situated in the weapon- helping hands dimension, but the resistance of the lighter (point 7) is inelastic. This means that the producer does not need to invest

further in improving the resistance of the product because the customer will not appreciate those efforts. But the effort in feature 6 (no dirt/ash) will lead proportionality to customer satisfaction. The feature 5 (nice fir smell) can be seen as the single feature in the upper elastic region, meaning that the producer could reach customer delight if investing in its quality, a real strategic advantage on the market.

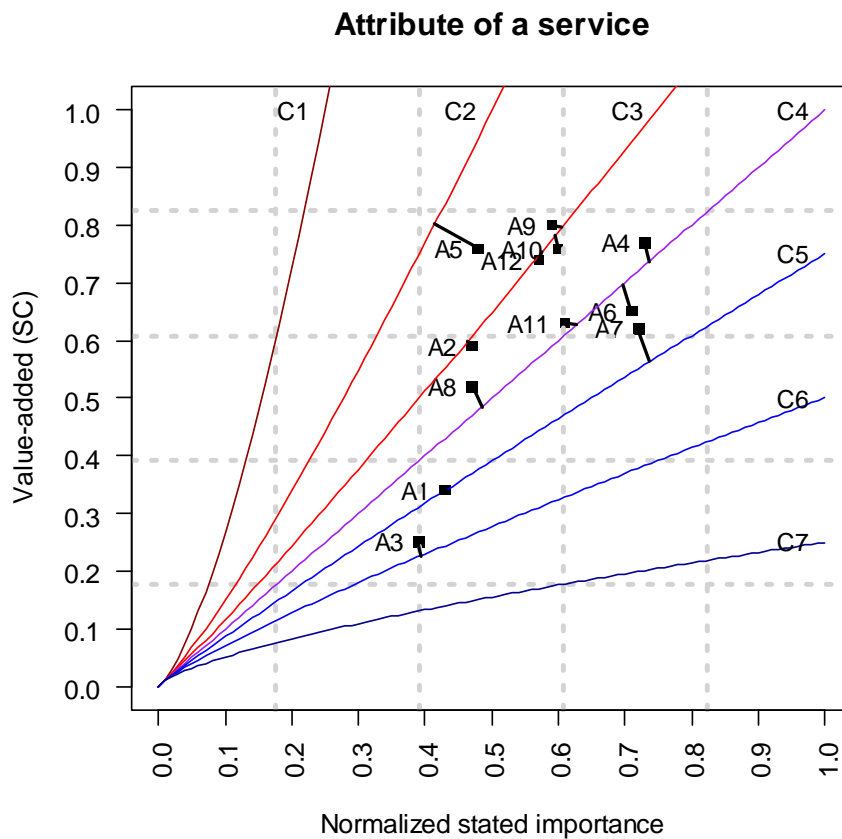


Figure 4. The HWWP non-linear model with elasticity curves

The case study proves the Kano with HWWP visual model is a very useful instrument in determining the features of the new products, which a spin-off eager to launch on the market.

Academic spin-offs have the opportunity to take research towards new levels of innovation if the academic entrepreneur understands the importance of market orientation and especially the focus on the voice of the customer.

The present paper proposes methodological steps researchers are comfortable with to change their focus from pure research towards understanding their market. For Romania, a country with an emerging economy it is crucial for spin-offs to improve their performance and survival rate. Universities and research centers should take the initiative and organize specific entrepreneurial courses regarding the market needs by integrating the Kano model.

By recognizing the value of technological transfer and the AS's potential for the regional development, more studies should be carried out pointing out the importance of market requirements for AS on more spin-offs.

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THE IMPLEMENTATION OF GIS SOLUTIONS IN THE FIELD OF TRANSPORT OF PETROLEUM PRODUCTS (“OIL & GAS”), IN A NATIONAL COMPANY - PART OF THE LOCAL ENERGY ARCHITECTURE

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Abstract

Purpose – *The approach starts from the definition of GIS as a technology that allows the manipulation of geographic information (geospatial), in order to determine the future behavior of the equipment.*

Methodology/approach - *We will analyze the current situation, the factors that influence the effectiveness of maintenance management and we will calculate financial performance indicators.*

Findings – *Now, the Crude Oil Pipeline System is being monitored and operated largely by the SCADA system and there is no integrated computer application to centralize heritage, technical and operational information, including based on their geographical location.*

Research limitations/implications – *The SCADA system receives information from sensors installed on the pumps, but there is a limitation of the SCADA system in terms of history, so the possibilities for detecting abnormal behavior based on historical developments are limited.*

Practical implications – *To maximize the return on investment, we propose that the GIS system be integrated with operation, maintenance and intervention, resulting in an integrated and efficient system.*

Originality/value – *The implementation of a GIS system will contribute to increasing the efficiency of internal processes through fast access to data and real-time collaboration, anticipating problems and reducing the costs of operating and maintaining the infrastructure.*

Key words: *management, GIS, infrastructure.*

GIS systems and management of transport network infrastructures

In the oil & gas transportation sector, the use of GIS-type solutions has seen a sharp development, especially due to the opportunity to manage operational risks, especially through the management of causes that can lead to operational events (poor maintenance, lack of knowledge the exact characteristics of the infrastructure and the lack of tools that allow the analysis of the characteristics of the infrastructure in the geographical context of the environment that the infrastructure crosses, including: the impact of the characteristics (physical and chemical) of the soil, the identification of high-risk areas from the perspective of the potential for environmental damage and of the population etc.). This information, characteristic of the "pipeline integrity management" discipline, cannot be managed in the absence of an IT tool that allows recording and working with technical information attached but at the level of some linear pipeline sections and that also allows viewing the physical and chemical characteristics of soil, as well as the location context of the pipeline infrastructure (human settlements, the size of the potentially affected population, proximity to other networks that can either cause or be affected in case of operational incidents, the impact on the environment and the impact environment on the potential for aggravating the effects of an operational incident, etc.).

The management of the integrity of pipeline networks has seen particular development and awareness in recent years due to a general process of aging of pipeline networks worldwide.

Operational justification of the implementation of a GIS type system

To maximize the return on investment and the benefits of projects implementing geospatial information management solutions, these solutions must be integrated into the company's IT infrastructure. By integrating these solutions with those for operation, maintenance and response, an integrated system is obtained that effectively communicates and supports all stages of the planning, design, construction, operation, maintenance and incident response processes of an infrastructure operating company of transport.

Currently, even though ERP or maintenance activity management systems allow the management of the technical characteristics and history of infrastructure elements, and CAD systems allow the drawing of infrastructure elements, none of these systems can manage location information as a GIS system. ERP or maintenance management systems do not allow working with geographic (positioning) or linear coordinates and cannot attach a technical characteristic such as diameter or type of insulation, but only for a defined pipe section, between two points clearly determined by coordinates.

Similarly, it is not possible in an ERP system to geographically locate a work order in the sense that one can specify the linear coordinates between which a job was executed and then be able to retrieve that information, but this time by selecting of a certain map area (retrieval involving transformation from linear coordinates to spatial coordinates and vice versa). On the other hand, CAD systems operate with static files, where features and attributes cannot be attached to drawn elements, data structures cannot be created, and collaboration between multiple users is not possible.

Now, the National Pipeline Transport System (SNTT) is mostly monitored and operated through the SCADA system from a technological point of view, and there is no integrated IT application that centralizes heritage, technical and operational information, including based on their geographical location. Through SCADA, information is received from the sensors installed on the pumps, but there is a limitation of the SCADA system about history, so the possibilities of detecting abnormal behavior based on historical developments are limited. We believe that it would be very useful to be able to do a historical analysis to determine the future behavior of the equipment.

The implementation of a GIS system (the creation of a unified database of spatial and non-spatial objects and attributes and the existence of a programmable platform through which workflows and functionalities can be implemented) creates the opportunity for the subsequent implementation of software "tools" and functionalities that geospatial technology makes them available. International studies¹ have shown that a basic geospatial infrastructure has a cost-benefit ratio of 1:1. When the company continues the process of developing the geospatial solution through its integration with operations and maintenance elements, as well as with the integration of other specific work processes, then the cost-benefit ratio increases exponentially, to values that cannot be easily quantified, but which affect positively the whole organization.

By implementing integrated systems such as MIS (Management Information System) and GIS (Geographical Information System), respectively, the degree of risk associated with the operation of the infrastructure is lower than if there is no automatic management tool for these activities, and the confidence of investors in such a company and that it will not be affected by major operational incidents that influence its financial performance, is greater.

The recommended technical solution for the implementation of the GIS system within the company that operates SNTT consists of an enterprise-type GIS system. The proposed system will initially consist of two advanced desktop workstations as well as a client-server web application platform that will be used by the mass of users. The system will also include mobile applications that will allow both the input of data from the field and the visualization of infrastructure details.

The desktop workstations will be used for data retrieval operations from existing sources within the company (measurements available for the entire network, made within a previous measurement project, positioning information of the pipeline axis, component elements and of corrosion points obtained from smart earthworks, cadastral information from existing situation plans, technical schemes). Also, these

¹ See "The value of a Utility GIS - a whitepaper" published by GITA (The Geospatial Information & Technology Association).

workstations will be used for complex reporting, analysis and thematic mapping operations, using positioning informations and technical characteristics, maintenance history.

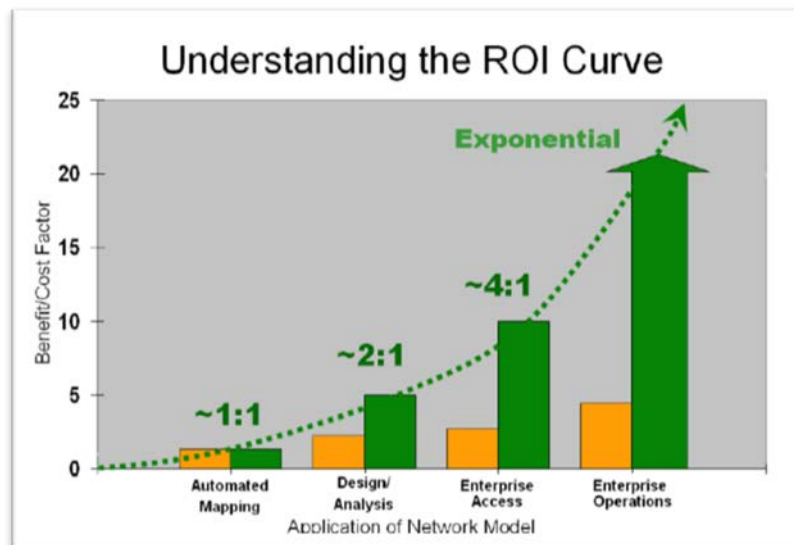


Figure 1: Evolution of the Cost-Benefit ratio of implementing a geospatial solution, depending on the level of implementation

The integration with the ERP system will allow the association of information on revisions and repairs to the relevant infrastructure elements, at the relevant points and the visualization of this information in the GIS environment, together with the rest of the technical information relevant to the selected network section. Thus, there will be a complete technical view of the state of the infrastructure and it will be possible to investigate the causes of the appearance of corrosion at certain points of the network. Integration with the information system for document management will allow attaching any document type element (text, picture, diagram, etc.) to an infrastructure element, as well as indicating the exact area of applicability of this document within the linear network elements (for example, will be able to attach a technical sheet for the pipe from which the pipeline is made only between two identified points, either by geographic or linear coordinates, and will be able to attach a picture exactly at the point on the pipeline route to which that picture refers).

The GIS system will also manage all the information regarding the properties of the company, in the sense of their identification, their exact positioning at the correct geographical coordinates and the centralized storage of all relevant documents (cadastre, etc.).

One of the additional workflows implemented within the GIS system is that of analyzing and issuing approvals for constructions carried out in the vicinity of pipelines. The system will allow both the retrieval of information regarding the properties where approvals are issued, as well as the making of measurements, the extraction of relevant sections from the detailed map of the area and the electronic management of all approval file documents. The information regarding the issued approval will be saved in the map and will be able to be viewed later by the OTC staff (pipeline route operator) or by other authorized personnel, who will be able to check compliance with the approval conditions in the computer system on the ground.

We also propose the implementation of a set of specialized functionalities for pipeline integrity management, which would allow:

- automatic identification of areas of the pipeline where there are integrity problems, automatic calculation of the maximum pumping pressure to ensure the safe operation of the pipeline and automatic calculation of the remaining life time (based on information automatically retrieved from the results of integrity inspections);
- the automatic proposal of some lists of investment works to remedy the integrity deficiencies found following the inspections;

- making detailed maps of the areas with integrity incidents, to allow their identification on the ground;
- the analysis of all existing data regarding the pipeline, aligned in a linear coordinate system, including the retrieval of information regarding integrity inspections and their history and estimation of the degree of corrosion evolution.

Proposed implementation strategy for the crude oil transportation infrastructure operating company

The proposed implementation strategy runs for 3 years and includes 2 investment stages with a duration of 1 year each, in years 1 and 3, respectively.

The first stage of the investment includes the purchase of software (licenses), completion of the necessary hardware infrastructure, purchase of the background map, configuration of the data model of the database, configuration and development of specific functionalities of the GIS system, including the mobile application for OTC and interfaces with IT systems existing (ERP and document management). Existing electronic information on the position and configuration of the pipeline network will be uploaded to the database, as well as information on a selected pilot pumping station for which the feasibility of the proposed data model will be demonstrated. The workflow for retrieving patrimonial cadastral information will also be configured, as well as the workflow for issuing notices within the Notice Service.

After the completion of the first investment stage, year two will be used to operate the new system and implemented functionalities for the purpose of populating the database and for the rest of the stations, as well as identifying opportunities to develop the system with new workflows, including other departments.

The second phase of implementation will take place in year three and will include the implementation of additional functionalities for the management and integrity analysis of the pipeline network. The tablet application for technical staff will be developed and new workflows will be implemented in the GIS system. We are considering integration with new IT systems, such as network loss detection, to pinpoint the exact location of loss points.

The GIS system is used for: property management (land, buildings); search and view equipment characteristics, technical documentation; view history of maintenance works; management of operational incidents; mobile applications for technicians in intervention teams; topology and network analysis; designing new investments; viewing information from external systems (financial, SCADA, maintenance management, industrial systems for historical analysis of sensor data).

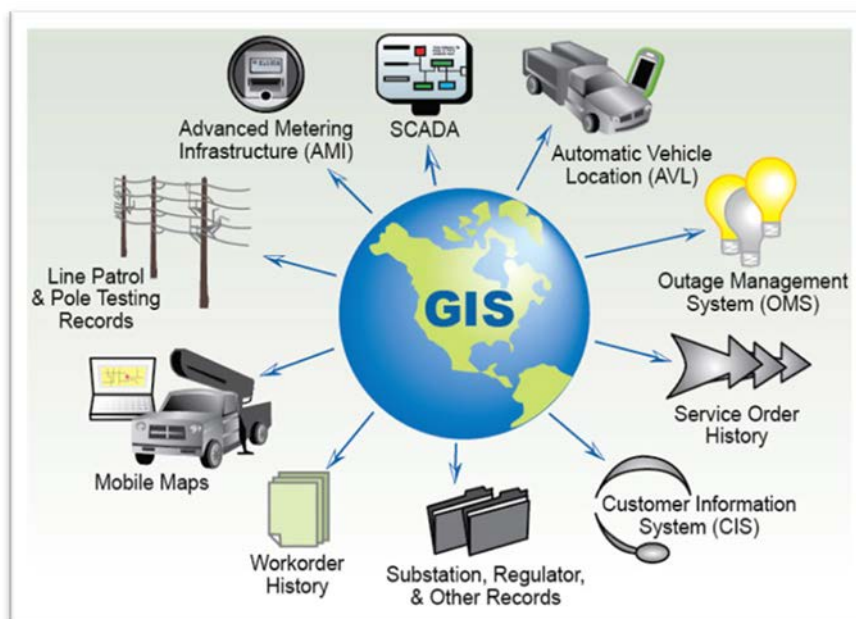


Figure 2: Integration of GIS systems with other typical IT systems

The role of the GIS system in the IT infrastructure of the SNTT operating company

A series of opportunities to optimize the current way of working resulted from the interviews with the company's staff. The solution of some of these can be the subject of the implementation of a GIS system, but a general solution can only be obtained through a combination of technical measures (the implementation of other types of information systems), administrative and procedural.

Regarding the information available from smart godavils², we specify that they contain not only information about the location of the pipeline axis, but also additional information that can be used to automatically create in the GIS system network elements such as pipe, valve, elbow, teu, discounts. Information on the condition of the pipeline in terms of its integrity can also be retrieved automatically.

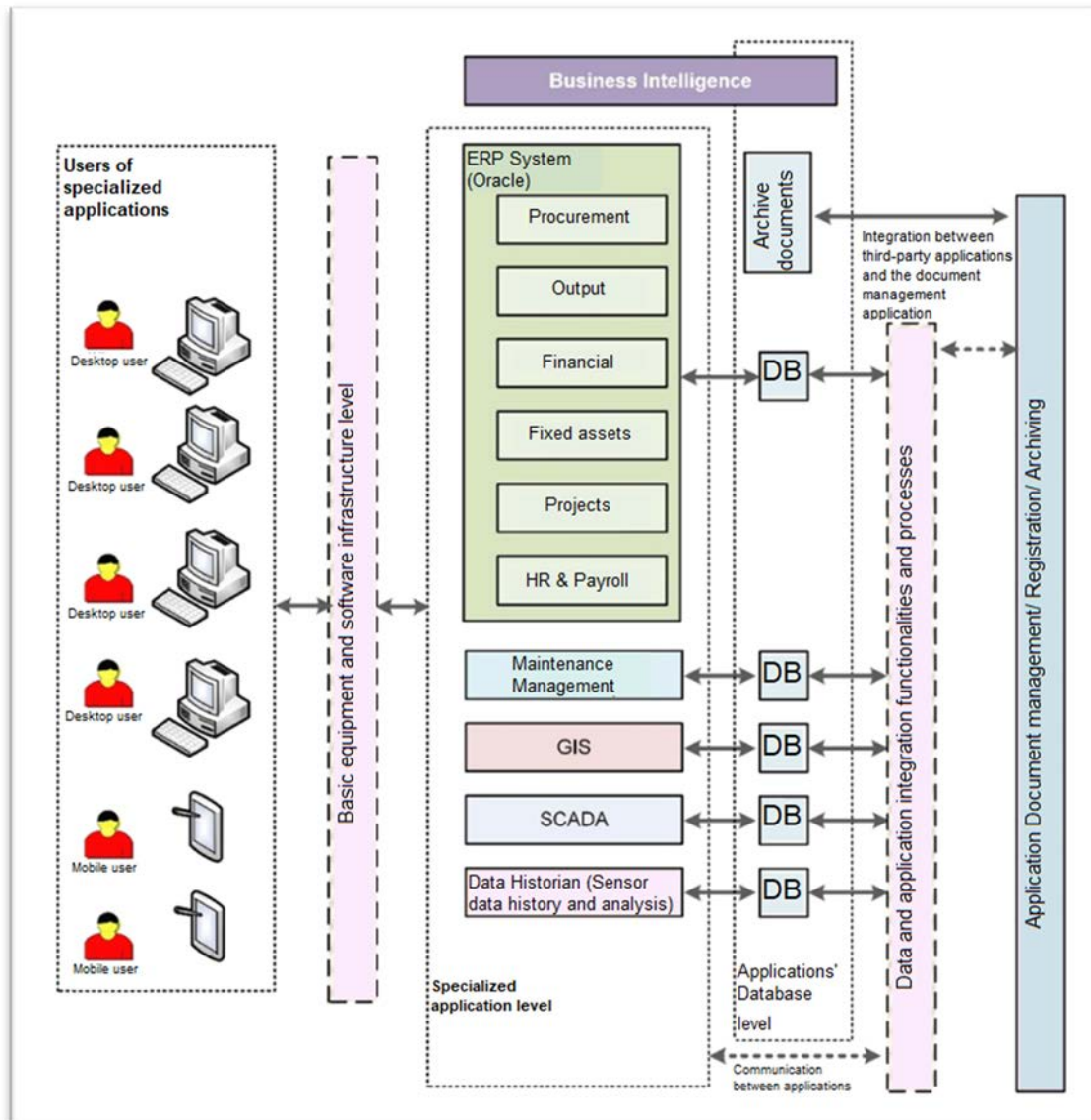


Figure 3: Typical application ecosystem

² This information is available for buried pipelines for which electronic pipeline integrity reports exist. For a correct understanding of the role of a GIS system, we consider it useful to present the typical ecosystem of IT applications.

Maintenance management; the nomenclature of causes, defects, repairs for each type of equipment; annual preventive maintenance plans, based on the entire list of equipment managed in the system, with automatic estimation of the necessary resources, personnel and costs are not available in the current ERP system, but are necessary and requested by the technical departments with which they had analysis interviews take place. We believe that a detailed analysis of the needs and specific requirements from the point of view of computerized maintenance management is necessary.

Costs and revenues generated by project implementation

The revenues generated by the project are related to savings in operating costs achieved following the implementation of the project (reductions in costs for the relevant personnel for the implementation of the project, reductions in expenses with maintenance activities, support, maintenance, savings generated by reducing expenses with breakdowns, with moving staff to ensure maintenance and carry out other current activities and greening/environmental protection expenses).

The incremental operational costs generated by the implementation of the project are operational costs necessary to implement the GIS system (phone, tablet subscriptions, PODS subscription), as well as maintenance costs (maintenance of GIS licenses stage I, technical support operation, maintenance for the licenses associated with the new investment – stage II). The investment costs were calculated based on realistic estimates that were based on offers from specialized suppliers, similar projects carried out in companies that manage infrastructures similar.

The costs have been estimated and framed in such a way as to achieve the capitalization of as large a proportion of the investment value as possible.

The breakdown of costs (without VAT) over the duration of the investment is as follows:

Total investment: 4,406,037.00 lei, of which:

year 1: 2,090,650.00 lei

year 2: 467,337.00 lei

year 3: 1,848,050.00 lei

Table 1. Performance indicators - financial analysis

Project indicator	Result value	Conclusion
INVESTMENT		
Internal rate of return (RRF/C)	12,48(>4%)	The project is financially profitable
Financial net present value (FNPV)	1.503.254	
Benefit-cost ratio	1,2	
Recovery period	approx. 3 years	

Table 2. Calculation of the Internal Rate of Financial Return of the Investment

Calculation of the Internal Rate of Financial Return of the Investment (lei)	Updated Total	Out of Date Total	1	2	3	4	5	6	7	8
TOTAL ENTRIES/ REVENUES	9063110	10864958	0	473594	957028	1451715	1910932	1989309	2024000	2058380
Operating income	9063110	10864958	0	473594	957028	1451715	1910932	1989309	2024000	2058380
Residual value	0	0	0	0	0	0	0	0	0	0
TOTAL OUTPUTS COSTS	7559856	8303387	2091340	895137	2278610	607660	607660	607660	607660	607660
Operation and maintenance costs (including replacement costs)	3311217	3897350	690	427800	430560	607660	607660	607660	607660	607660
Total investment	4248639	4406037	2090650	467337	1848050	0	0	0	0	0
NET CASH FLOW	1503254	2561571	-2091340	-421543	-1321582	844055	1303272	1381649	1416340	1450720
Discount rate	4,0%		1,0000	0,9615	0,9246	0,8890	0,8548	0,8219	0,7903	0,7599
FNPV	1503254									
RIRF	12,48%									
Benefit-cost ratio	1,20									
Recovery period	approx. 3 years									

Conclusions

We appreciate that our involvement in the operational justification of the implementation of a GIS-type system, as being the feasible and efficient technical way of managing linear infrastructures for the companies that manage or operate such infrastructures, through the use of GIS-type technologies, will contribute to the achievement analyzes based on the data collected from the economic-financial and production systems, of the technical and operational aspects.

Geospatial infrastructure management solutions provide many benefits, such as increasing the efficiency of internal processes through rapid access to data and real-time collaboration, anticipating problems and reducing costs related to operational incidents, increasing efficiency and reducing overall infrastructure operation and maintenance costs.

The COVID-19 pandemic has involved many unknown parameters, most of which have a spatial dimension. Thus, spatial analysis and GIS could provide appropriate decision-making tools, predictive models, statistical methods and new reporting technologies for management, avoiding direct staff contact and providing opportunities for spatio-temporal analysis, geo-business, participatory GIS, Internet of Things (IoT), Location Based Service (LBS), Web Mapping, Satellite Image Analytics and Pipeline Integrity Management/Failure Management to minimize causality, limit incidence, establish effective communication, provide new approaches for business in isolation situations, telework, adaptive decision making.

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POST-PANDEMIC CHALLENGES CONCERNING FEMININE VS MASCULINE LEADERSHIP

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Abstract

Purpose – The main contribution of the study is highlighting the differences between the female and male leadership style. The study will try to define from the investigated leaders a profile of a male/female leader, the most important values put into practice and the pandemic and post-pandemic challenges they had to face.

Methodology/approach - The study aims to explore the profile of a leader by conducting semi-structured interviews with businesswomen and businessmen in order to establish the main personal and professional characteristics which contribute to a successful career.

Findings – The results of the study show which of the leadership styles, male or female, makes the difference in successful companies and in which areas they operate. The data obtained will also highlight the changes that the leaders made after the pandemic in order to adapt to the new working conditions.

Research limitations/implications – While the study has highlighted that there is a different way of practising management which values other skills and abilities, the results show that successful women are able to use the feminine values in the style of management in certain areas of activity.

Practical implications – The valorisation of personal skills in a pandemic context could balance the two types of leadership.

Originality/value – The main contribution of the study is highlighting the specific elements regarding post-pandemic challenges concerning feminine vs masculine male vs. female leadership.

Key words: male vs. female leadership, successful leadership, post-pandemic, leadership style.

Introduction

The literature on leadership is full of theories, definitions and classifications. These have undergone constant changes and developments throughout the years in line with both historical and economic events. The 19th century was dominated by the "Great Man" theory, according to which leaders are born and not made. One of the most famous supporters of this theory, Thomas Carlyle, believed the history of mankind is nothing more than a collection of great man biographies.

In the 1930s and 1940s, another theory of leadership, derived from the "Great Man" theory and known as the Trait theory, emerged. Unlike the "Great Man" theory, the Trait theory starts from the assumption that leaders can be born or made. This theory postulates that a leader's efficacy is determined by the traits or character a leader possesses (Verawati, D.M. and B. Hartono, 2020). One of the most representative exponents of this theory, Ralph Stogdill, tried to identify the most important traits defining an authentic leader. In his opinion, these traits include intelligence, insight, responsibility, initiative, persistence, self-confidence and social skills.

Between the 1940s and 1950s, the Trait Theory evolved into the Behavioural Theory. This new approach considers that a leader's success is based more on his/her behaviour and less on his/her innate traits. The paradigm of this theory can be summarised as follows: leaders are made, not born. Thus, a leader can be effective if he or she is willing to learn and implement appropriate behaviours.

After 1960, a new theory of leadership made its presence felt, namely the Contingency Theory or Situational Leadership. The essence of this theory can be concentrated in the following sentence, assigned to Paul Hersey and Kenneth H. Blanchard: Effective leaders need to be flexible and must adapt themselves according to the situation. There is no best leadership style, but the better the leadership style is, the better it will adapt to the environment (Hersey, P. and K.H. Blanchard, 1988).

After the 1990s, other leadership theories developed, the most famous being the Transactional, Transformational, Collaborative and Servant theories. The transactional theory is based on the idea that the act of leadership is a transaction, a social exchange between a leader and followers (a cost-benefit exchange), based on a system of rewards and punishments applied by the leader to the followers in order to achieve the best performance by the followers. A diametrically opposed approach is taken by the Transformational Theory, which considers that a true leader must be able to inspire, encourage and motivate subordinates so that together they can achieve the best results for the company. The transformational leadership has four components: idealised influence, inspirational motivation to enhance confidence, intellectual stimulation, and individualised consideration (Bass, B.M., 1990).

The key element of the Collaborative Theory derives from the name of the theory, namely collaboration. Collaborative leadership involves the development of mutually beneficial relationships between leaders and followers, based on trust and mutual respect, in which organisational interests prevail over individual interests. This collaboration requires decentralisation of power and the involvement of followers in decision-making so that organisational objectives are properly achieved.

The Servant Theory is a more recent approach to leadership in which the leader focuses on the subordinates' needs, putting their professional development first. The servant leader leads with love (in a social and moral sense), acts with humility, is altruistic, visionary, trusting and serving (Dennis, R.S. and Bocarnea, M., 2005).

The on-going development of leadership theories has also led to changes in the definition of leadership, the modern one differing from the traditional one. While the original definition of leadership focused more on the characteristics of a leader, today leadership is often defined as a process by which the leader influences a group of individuals through various tools in order to reach a common goal.

Leadership and gender differences

Most research and management literature attempts to establish, without discussing gender differences, typologies of leadership styles and models which are most relevant to organisational circumstances and external cultural contexts. However, as a result of the increase in the number of women in leadership positions, some possible differences between men and women (Pew Research Center, 2008) have been identified in terms of the advantages and disadvantages of the management styles adopted, but no consensus has been reached on this point. The under-representation of women in managerial positions (Cornet, A. and Cadalen, S., 2009), highlighted in the conclusions of a Eurostat statistics of March 2020 at the level of companies in the European Union, has also been explained. The only exception is Latvia, with 53% of women in managerial positions, Romania being in the mid-ranking, below the EU average of 37% (Faier, S., 2021).

The fact that relatively few women occupy top management positions is explained not by their cognitive inferiority, but by a much greater societal recognition of traits associated with masculinity. Businesswomen have been wrongly labelled a 'masculinised version of women', although there is no research to prove that women's success in male-dominated management positions is due to changes in personality or emotional life. In fact, it is not a question of an androgynisation of femininity, but of a social perception based on the idea of the hegemony of masculinity. However, it is considered that successful women in top management have a planning ability, strategic thinking, making responsible decisions that lead to company profit (Stănculescu, E., 2009).

Some authors (Loden, M., 1985) support the existence of masculine styles of management, characterised by competition, hierarchical authority and emphasis on control, and feminine styles of management, focused more on consensus, which can facilitate corporate decision-making and encourage creativity. The female leadership style would be interactive, relationship-oriented, transformational, focused on emotions, participation, sharing power and information, motivating followers, tasks and results, bonding people and things (Cornet, A. and Bonniver, S., 2008). However, in organisational studies, beyond a number of stereotypes that women are more relationship-oriented

and men more task-oriented, there is no evidence of differences between male and female leadership styles. These differences are found in laboratory experiments and assessment studies on men and women who do not necessarily hold leadership positions. The three types of studies show only a more autocratic leadership style for men and a more democratic one for women (Eagly, A.H. and Johnson, B.T., 1990).

In an article on women's management and leadership, Frédérique Pigeyre and Philippe Vernazobres (2013) discuss three works they consider relevant and significant on this topic: *Le management au féminin* (Renaud-Boulart, 2005), *Le leadership au masculin et au féminin* (Cherret de la Boissière, 2009), *Le leadership au féminin* (Fourès, 2010) / *Female management* (Renaud-Boulart, 2005), *Male and female leadership* (Cherret de la Boissière, 2009), *Female leadership* (Fourès, 2010) which convey stereotypes about the differences between men and women, asserting the existence of specifically female competences. Thus, for M. Renaud-Boulart, female leaders act energetically and intensely, are task- and result-oriented, organise their work, emphasise their emotions, show enthusiasm and commitment to their work, whereas male leaders have more strategic skills, are more calculated, control their emotions and deal objectively with problems. According to A. Cherret de La Boissière, female leaders focus on tasks, are pragmatic, promote their results less, respect rules, are committed, responsible, aim for collective success, anticipate and manage risks, use complicity to make themselves liked and/or recognised, know how to listen, are empathetic, diplomatic, encourage dialogue and questions, express their emotions; male leaders, for their part, make their actions known, have a strategic vision and a logical and analytical approach, are self-confident, performance-oriented, take risks and responsibilities, manage energetically, decide and arbitrate without conciliation and without emotional involvement, naturally use authority and charisma. Finally, E. Fourès considers that female leaders show courage, the ability to achieve results, efficiency, intuition, motivation, determination, a humanistic approach, care about work-life balance, adopt an affectionate and proxemically oriented leadership style, lead teams focused on results, while men focus on defending territory, networking, influencing. Beyond these considerations, which perpetuate stereotypes about the differences between men and women, Frédérique Pigeyre and Philippe Vernazobres (2013) conclude that the promotion of female management seems an ambivalent approach, which would lead both to the development of diversity within the organisation and to the practice of different managerial styles.

According to a relatively recent study (Champoux-Paillé, L., 2021), a new, more feminine form of leadership has emerged during the COVID-19 pandemic in business. This conclusion is in line with the results of another study conducted, also in 2021, by McKinsey & Company et LeanIn.Org in 423 American and Canadian companies. Thus, women were able to exercise stronger leadership than men when employees' well-being became more important at the organisational level (through actions to support team members, helping colleagues manage work from home, or caring for their colleagues' mental health). The study also found that women are almost twice as supportive as their male colleagues of other women or employees from minority groups, through mentoring or sponsorship, and in this way contribute to a better working climate and to retaining or increasing the number of employees, in the context of a general labour crisis.

Certainly, the existence or not of different management styles according to gender, far from being based on indisputable scientific work, cannot be analysed outside the cultural and national context, which influences gender stereotypes, or outside the dominant organisational culture.

Data analysis

The research aims to a better exploiting of professional knowledge, managerial communication skills and interaction between leaders and subordinates. At the same time, our research seeks to identify how businesswomen can succeed and underline their managerial abilities beyond the stereotypes.

The qualitative research was designed to investigate the differences in managerial style between men and women, the challenges generated by the emergence of the pandemic and how leadership has been influenced, as well as the factors contributing to stereotyping in women's undertaking of leadership roles in specific business areas. Accordingly, we conducted 16 semi-structured interviews in Bacau, Romania (7 men and 9 women in leadership positions and aged between 32 and 70). The areas in which the investigated subjects work are: education, economics, public administration, informatics, entrepreneurship, engineering, automotive industry and sport.

As a first step, we were interested in surveying which values prevail in the organisation and whether we can speak of a well-defined organisational culture. The majority of the subjects consider that there is a well-defined organisational culture, based on values such as: integrity, transparency in decision-making, honesty, responsibility, adaptability, equality, loyalty, efficiency, performance, sense of duty, communication, tolerance, respect. This wide range of listed values shows that top management tries to implement them in the way they relate to employees or in the way the organisation is perceived by both external and internal public.

Questioned whether there is a difference between management and leadership, 15 respondents consider that the concepts are different and only 1 respondent thinks that the two can overlap conceptually, although few of them were able to provide relevant explanations as to the specific difference between the two terms. Management is the activity of guiding, coordinating, directing a group of people, an organisation, in order to achieve predetermined objectives. Leadership is the ability to create vision, motivation and momentum in a group of people, often through the use of psycho-behavioural tools (Male, 46 years old, public administration field). "Management is about leading an entity effectively. Leadership is about inspiring people, structures and facilitating their progress in an innovative way" (Female, 57, IT field).

In response to the question of what main professional/personal skills a leader should possess, the respondents mentioned: creativity, honesty, altruism, resilience, professional knowledge, adaptability, visionary, creator of change contexts, initiative, intuition, responsibility, altruism, intelligence, good communicator. We can see that personal skills predominate and that they are also extended to the organisational level, integrated into the elements belonging to the organisational culture. The managerial style adopted is closely related to personal skills. 11 out of 16 subjects state that they follow the participative style, 2 respondents - the authoritarian style, 1 respondent - the conciliatory style, 1 subject - the mixed style and 1 subject answered that it depends on the context.

The majority of subjects also consider that the style is influenced by personality, but is also adapted to the area in which they work (10 of those surveyed), that it is strictly personality-related (4 respondents), while a small segment considers that it must be adapted according to the professional area (2 subjects). The data highlight that managers put their personal touch on the way they undertake the management of an organisation, but they also take into account the specifics of the field in order to make their work more efficient, which shows adaptability and tolerance. The leadership literature often inoculates the idea that a leader is an extension of the organisation or that a leader's personality can radically change the organisational culture.

Regarding the managerial profile of a woman compared to the managerial profile of a man, the responses collected showed that there are significant differences for 15 of the subjects, while one respondent considers that there are no differences: "A woman is professionally well prepared, but less managerial, full of confidence in her own strengths (and not only), authoritarian (to impose herself on men), charming (in some cases), slippery, more empathetic than men. The male manager is ambitious, authoritarian with opponents and more democratic with others, a good professional, persevering (but also in mistakes), manipulative" (Female, 54 years old, education field). "A female manager is a good organiser, planning-oriented, monitoring-oriented, generally able to take all those measures necessary for the smooth running of things. The male manager, by nature, controls, supervises, hires, fires, and generally manages activities involving the exercise of authority, the aim being the smooth running of these activities" (Male, 32, engineering field).

To the question "Do you think there are significant differences between female and male leaders?", 14 people answered that there are differences based mainly on communication skills, intuition, negotiation/mediation skills, authority, moral profile, image, emotional intelligence, diplomacy, patience. However, respondents recognize that some and others can be exceptional leaders, while 2 subjects consider that there are no gender differences. The image of a leader is related to how others interpret his decisions and actions. The imagological construction of a nation is based on categories, stereotypes, prejudices and social labelling, positive as well as negative, which once created and spread become illustrative for the way they are perceived (Pew Research Center, 2008). Although, all of these imagological elements are often difficult to be defined and differentiated, they contribute to creating the social image and the specific defining features of a nation and the way they think and act (Daba-Buzoianu, Cîrțiță-Buzoianu, 2014: 677-678).

We asked our subjects if they could list some gender stereotypes about leadership. The answers summarise some suggestive examples: "Men are born leaders, Engineering is not for women, Women and men have different skills" (Female, 54 years old, field of education), "Women are not interested in success as much as men" (Male, 32 years old, field of engineering), "Women have to take more of the traditional role of mother and wife, Men have to bring in money and social status" (Female, 54 years old, field of economics). From the collected answers we can see that these stereotypes are known, from professional practice and that they apply both ways. Corroborated with the answers to the previous questions, i.e. the three questions that focused on the managerial profile of a woman/man and the differences between male and female leaders, we can notice that in professional practice there are still reminiscences of the existence of these stereotypes, but not in a radical way, there is also a tendency to refine and reinterpret, through the power of example, certain imagological barriers. This also emerged from the answers given to the question "whether there are certain areas or situations in which women leaders are more suitable than men". 7 out of 16 respondents believe that leadership is not related to gender but to professional training. 9 people believe that there are areas where women are more suitable, such as: public relations, human resources, education, health, commerce, advertising and economics. The next two questions asked how leaders coped organisationally with the limitations imposed by the pandemic and whether there were changes in leadership after the pandemic. "There was a need to adapt quickly in terms of organisation, technology and relationships. Decisions were reconsidered and there was a constant evaluation of them" (Female, 57 years old, education domain) "Management was done by rethinking the work schedule and making employees responsible for their health and the health of those around them. Unfortunately it also required downsizing and reducing the working hours of non-essential staff, retaining critical manpower in key positions in the organisation" (Male, 32, engineering domain). The majority of respondents felt that there had been no major changes in the way they were managed after the pandemic, but that they were more attentive to the needs of their employees' personal lives and health.

The last question surveyed "what was the most difficult situation you faced in your job and how did you manage to overcome it?" "One difficult situation was when some of my colleagues in the subordinate services got sick with COVID-19 and there were very short deadlines to finish some activities, but through effective communication I was able to get support from colleagues in other services, they joined in by putting in much more effort, working overtime to finish all activities on time" (Male, 45 years old, public administration). Among the difficulties listed were: lack of involvement of employees, delegation of tasks, recognition of the authority of younger leaders, radical decisions they took, resolving internal conflicts at organisational level or handling situations with ethical implications. This range of issues is a reflection of the way in which, on the one hand, leaders build their identity and strengthen their image at organisational level and, on the other, how they relate to their subordinates in various crisis situations.

Discussion and conclusions

The interviews indicate that the leaders of a business are aware of the differences in style, the main advantages and disadvantages compared to the men are in the collaboration with the employers and in the stereotypes that they had to face.

Although there are not very clear differences between the two leadership styles (male vs. female), based on the interviews it emerged that the respondents recognise that there are stereotypes related to women leaders, different ways of coordinating work within the organisation or certain areas where they can perform. The challenges brought by the pandemic have led leaders to take on new roles or adapt quickly to the new working conditions. Personal skills have been important in managing this crisis situation, and the post-pandemic management is increasingly focusing on employees' personal needs and health issues to ensure an optimal workplace climate.

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MODERN CUSTOMER RELATIONSHIP MANAGEMENT SYSTEMS (CRM'S) IMPLEMENTATION AND IMMEDIATE EFFECTS ANALYSIS ON SME'S

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Abstract

Purpose – Our paper looks into the main characteristics of modern CRMs and analyze the implementation stage and immediate effect analysis in 10 diverse Romanian SMEs in a post COVID-19 world.

Methodology/approach – The research team conducted a semi structured questionnaire with 10 executive managers and used personal observations, through studying the reactions before and after CRM implementation.

Research limitations/implications – Only SME's which implemented the AIDA CRM solution since 2019 were selected as case studies, so that the interviewed managers have a fresher perspective on post-implementation organizational changes and the immediate effects of CRM implementation during the pandemic.

Practical implications – Modern CRMs have the ability to increase business profitability and streamline workflows, automating various tasks and achieving team synergies, in order to increase organizational performance and efficiency.

Originality/value – The current research gap, considered a missing piece in the research literature, is the area that determines the process and benefits of implementing a modern CRM for Romanian SMEs. Therefore, through this scientific paper we analyzed the determinants of a modern CRM implementation and analyze the immediate benefits in 10 Romanian SME's, each operating in a different field of activity.

Key words: Customer Relationship Management.

Introduction

Prior to the COVID-19 pandemic using a Customer Relationship Management System (CRM) was seen as something to be implemented by large enterprises, usually Romanian SME's being more skeptical in regards to it's benefits.

However, the rapid migration of traditional brick and mortar clients in the digital economy, simultaneously with strict social distancing regulations imposed by the pandemic has created an urgent requirement for more SME's to evolve and start using digital business solutions in order to work from a distance and serve digital clients, so the question arose, are solutions such as CRM's worth the investment for SME's?

A significant contribution to our modern business approach of seeing retention costs of clients as being less expensive than acquiring new ones was made by Reichheld, Markey, Hopton (2000) which inspired a series of customer retention strategies that were incorporated and automated into the digital systems known today as "Customer Relationship Management", according to Roberts, Liu, and Hazard (2005).

Nowadays, modern CRMs have the ability to increase profitability and streamline workflows, automating various tasks and achieving team synergies, in order to increase organizational performance and efficiency.

Because the needs of every business are so diverse, from strategic, operational, analytical, employee collaboration or customer data platforms, there are hundreds of CRM solutions on the market, tailored to fit the multiple needs of diverse businesses.

In recent years, there has been a significant increase in the commercial offering of various types of CRMs, as well as numerous scientific articles, which shows that a CRM is necessary to ensure long-term business sustainability, such studies are seen in the works of authors such as: Chang (2007), Shanks, Jagielska, Jayaganesh (2009), Loh, Koo, Ho, Idrus (2011), Nahar, Dhaka (2014), and many others.

Customer relationship management is widely regarded as an essential business philosophy that focuses on retaining and improving customers. "Successful implementation of CRM results in reduced customer dropout rates, reduced costs, and increased revenue", according to Yee-Man Siu [2016].

However, the literature largely deals with the benefits of CRM implementation by large enterprises, but there are significant fewer studies on the benefits of CRM implementation in the small business sector and even fewer studies on the impact of CRM systems on Romania SMEs.

The current research gap, considered a missing piece in the research literature, is the area that determines the process and benefits of implementing a modern CRM for Romanian SMEs.

Our paper aims to see how a modern and adaptable CRM has created added value in 10 different areas of activity, by analyzing the challenges in the implementation process and analyzing the immediate effects and benefits of implementing CRM's for 10 Romanian SME's, each from a different field of activity, as follows: Tax Consulting, Grants Consulting, B2B Sales (Business to Business), Architecture Studio, Sales B2C (Business to Clients), Topography, Medical Office, Software Development.

Research methodology

The research conducted a semi structured questionnaire with 10 executive managers and used personal observations, through studying the reactions before and after CRM implementation, from a personal perspective, as members and partners of the Holisun team that made the 10 CRM configurations.

Because we worked with business informations that are considered sensitive by some entrepreneurs surveyed in the study, we will not publicly disclose the names of those 10 companies.

Only SMEs that have implemented the AIDA CRM solution in 2019-2020 were selected as case studies, so that the managers interviewed have a fresher perspective on post-implementation organizational changes and the immediate effects of CRM implementation.

The questions included in the semi-structured interview are the ones from the following Table 1.

Implementation analysis

1. Tax consulting company

About the company

Founding: Founded in 2005 in Baia Mare, Maramures County.

Specialization: transfer pricing consulting services, one of the most important companies with 100% Romanian capital operating in this sector.

Background: hired the first employee in 2010, in 2019 the company reached 21 employees, a gross income of 6.4 million lei (approx. 1.3 million EUR), and has a portfolio of 55 clients, consisting mainly of multinational companies (foreign and domestic).

Why did they need a CRM?

Most of the 21 employees specialize in providing transfer pricing consulting services, and 3 of these employees handle back-office operations, such as managing contracts, invoices and other day-to-day administrative activities.

They needed a CRM for the back-office operations team that manages administrative operations related to the company's clients.

Table 1. Interview questions for entrepreneurs. Source: Author

Question	Type of answer
1. What was the main reason for implementing a CRM?	Open answer
2. How much did it cost to implement CRM?	Open answer
3. How do you estimate the cost of CRM?	Open answer
4. How many customers do you have?	Open answer
5. How many employees manage these customers?	Open answer
6. Is there a difference between the number of employees involved in customer management, according to CRM?	Yes/No
7. What was the average customer satisfaction feedback before implementing CRM?	More than one answer: a) I have not used any feedback system before CRM b) 1-2 points c) 2-3 points d) 3-4 points e) 4-5 points
8. Has there been a positive monthly increase in customer feedback since the implementation of CRM?	More than one answer: a) No, there has been a decrease in customer satisfaction b) 1 point c) 2 points d) 3 points e) 4 points
9. Was there a monthly increase in target performance (sales, projects, etc.) per employee after CRM implementation?	More than one answer: a) Nu, results are the same b) Nu, results are weaker than before c) Yes, of 5-10% d) Yes, of 10-20% e) Yes, of 30-40% f) Yes, more than 40%
10. How long did it take to implement the custom CRM solution?	a) 1 luna b) 2 months c) 3 months d) 4 months e) 5 months f) 6 months g) more than 6 months
11. What were the main drawbacks in CRM implementation?	Open answer
12. If you've used CRM in the past, why would you want another CRM?	Open answer

How the CRM implementation went?

There were 2 preliminary online meetings between the general manager of the company, the 3 employees of support operations and development team of AIDA CRM, in which the first meeting was aimed at presenting the general platform AIDA CRM and obtaining feedback on what can be used from the AIDA CRM platform and which would be further developed to suit the particular needs of the company.

The second meeting dealt with the adaptation requirements and the resources that the company needs to provide in order to start the CRM platform configuration project.

Results after implementation

a) Customer satisfaction

Three months after the implementation of AIDA CRM, the tax consulting company registered a 1-point improvement in customer satisfaction, thanks to the "external ticket" function within the CRM, through which customer requests were automatically segmented into low-importance / medium / urgent priority, so the human resources dedicated to their solution could be allocated more efficiently, depending on the urgency of each request (emergency requests - settlement time 2 hours; medium requests – settlement time 8 hours; low requests - resolution time 16 hours).

Due to the external ticket functionality within the CRM platform, the company records an average customer satisfaction feedback higher by 1 point out of 5 after the implementation of the CRM, according to the statement of the General Manager.

b) Employee productivity

As most of the repetitive work of the support operations team was automated, such as invoicing, document generation, such as contracts and business offers, the efficiency of those 3 employees increased by 10-20 %, according to the company's General Manager.

CRM price and value perception

The CRM platform was implemented for the tax consulting company with few special configurations, in this sense the company had to pay only a SaaS (Software as a Service) subscription fee of 90 euros / month for the 3 users of the operations department support (30 euros per user).

2. Grants consulting company

About the company

Founding: Founded in 2007 by a single shareholder in Cluj-Napoca, Cluj County.

Specialization: The company specializes in providing consulting services related to accessing non-reimbursable funds for clusters as well as cluster management services, managing 3 of the largest clusters in the Transylvania region.

Background:

Hired its first employee in 2008, now the team consists of 4 employees and 16 collaborators who are paid according to the number of hours worked in projects and commission depending on results.

In 2019, the turnover of the company were around 500,000 lei (aprox. 100.000 EUR), but the company is also the beneficiary of several European non-reimbursable funds, for which the amounts received are not seen as turnover, but as state aid.

Why did they need a CRM?

Recently, it has become increasingly important to audit the work done by collaborators for each client, as clients usually pay a fixed amount for consulting services, but the costs for external consultants were variable depending on the number of clients, hours worked on projects, which until recently were not properly audited.

In this regard, after an internal analysis was conducted in the company, it was decided that the implementation of a customized CRM is the best way to audit the working hours spent on projects and improve communication within the company, in order to increase productivity.

How the CRM implementation went

The implementation process was a challenging one, as the standard CRM project management module had to be rebuilt according to the company's needs, as well as developing of a special time control function within the project management module.

The implementation process took about 15 business days, but the project was delivered in 3 months due to the limited resources of the CRM platform developer.

Results after implementation

The implementation of AIDA CRM was a success as all the technical requirements of the company were met and the delivery was made before the outbreak of the COVID-19 pandemic, which forced the company's employees and collaborators to work remote and thus work exclusively through the CRM.

a) Customer satisfaction

There was an increase in customer satisfaction by 1 point out of 5, customers appreciated the change, by the fact that the CRM provided a lot of important information about projects, projects that could be viewed by employees, collaborators and customers. According to the General Manager of the company, without the implementation of CRM, especially during the COVID-19 pandemic, it would have been difficult to imagine that the project deadlines would have been met, when all employees and collaborators had to work exclusively from home.

b) Employee productivity

A positive result of the quarantine imposed by COVID-19 was that employees and collaborators were more willing to use the CRM platform, having no other virtual work environment available for project management, even if the implementation of CRM meant greater transparency regarding the actual number of hours worked.

After implementation, the productivity of those 20 employees and collaborators increased by 5-10 %, and customer feedback also improved by 1 point out of 5, due to the transparency of the projects and the function of external tickets that prioritize requests from customers, which meant the ability to respond more quickly to requests for real client urgency.

CRM price and value perception

The company decided to rent a custom made CRM solution, by paying a monthly SaaS subscription of 15 euros per user, or 300 euros in total / month.

The company is satisfied with the price of the subscription in relation to the increased productivity after the implementation of the CRM platform, productivity according to the General Manager increased between 5-10 % in a difficult period in which employees and collaborators who were forced to work exclusively from home. The CEO believes that productivity will continue to rise after employees and collaborators return to the office.

3. B2B Sales company

About the company

Founding: Founded in 2008 with a single shareholder in Dej, Cluj County.

Specialization: largest business to business distributor of Dutch tulips in the Transylvania region, serving over 600 B2B customers from local florists to large retailers, such as the Auchan Romania hypermarket chain.

Background:

The company runs as a family business, the general manager's son-in-law running the warehouse in Dej, Cluj Country, the general manager's daughter being the operational director, and the general manager running the business from the companies public office from Cluj-Napoca, Cluj Country.

In 2019 the company registered a gross income of 6.5 million lei (aprox. 1.3 million EURO) with 8 employees, out of which: 4 warehouse employees, 2 sales agents, an operational director and a general manager.

Why did they need a CRM?

Dutch tulips are some of the most beautiful tulips on the Romanian market, but if the tulips are not sold before they reach the warehouse in Dej where they are rapidly distributed in Transylvania, they must be sold quickly at a discount or even discarded, being perishable products, with a short shelf life.

The company needed to implement a CRM to move from the simple Ecommerce site used to take a significant proportion of total orders to a CRM used by the 600 B2B customers-operational manager-supplier-warehouse-distribution for getting all orders in one place, aggregate those orders by size, categorize them and notify the Dutch tulip supplier when the order can be shipped, in order for them to collect the tulips and arrange transportation to the warehouse in Dej, from where they are distributed to clients in the Transylvania region.

How the CRM implementation went?

The project, more complex than a regular CRM customization, went smoothly as the technical needs were clearly established by the beneficiary and the project manager promptly answered all technical questions of the AIDA CRM development team.

The 600 B2B customers had no problem adapting to CRM, as they were used to ordering from the old E-Commerce platforms, where CRM automatically took the orders, the warehouse manager also liked the CRM platform, as it saw an improvement in warehouse management, through more efficient logistical communication with the Dutch supplier and Romanian customers.

Results after implementation

a) Customer satisfaction

A point of improvement of the feedback was noticed after the CRM was implemented together with its own integrated automatic feedback system. B2B customers could now provide feedback after each received order with just click on a star directly in an email sent by the CRM, such as " *, **, ***, ****, ***** " (5 points meaning excellent service).

Because management does not believe that the quality of the tulip was improved after the implementation of CRM, we assume that the mere fact that the company requested feedback via e-mail improved the perception of after-sales quality.

b) Employee productivity

The biggest increase in productivity after the implementation of CRM is that of the operations director who had time to "breathe" and avoid past mistakes in the ordering procedure to the dutch supplier.

The operations director told us that 30 to 40% of her daily work was automated, thanks to the CRM platform.

CRM price and value perception

Due to the extensive customization required for CRM, the SaaS subscription option was not available, so the customer paid 5,000 euros for a CRM license, the amount was paid in 6 monthly installments at the customer's request.

The implementation of the project required 35 working days by the AIDA CRM team. However, the project was implemented in 6 months, the client not being able to assign a project manager until the fall of 2019.

4. Architecture Studio

About the company

Founded: in 2000 as a family business by husband and wife, both experienced architects.

Specialization: residential and commercial architectural design, as well as in the management of construction projects

Background:

In 2019, the company registered total gross income of approximately 1 million lei (aprox. 200.000 EUR) with 7 employees.

The day-to-day operations are run by the wife, and the husband is the one who negotiates contracts and manages the largest clients in the fields of residential development and office spaces.

Why did they need a CRM?

As the company began hiring young and inexperienced architects, they had issues characteristic to young and inexperience employees.

The young architects did not pay as much attention to administrative issues associated with architectural projects, as when a building permit expired and must be extended, the young architects lacked knowledge of the various special documentation flows for each type of project, such as dwelling extension, urban planning permits, authorization from the monument authority, etc.

This type of problems created tensions between the management and the younger employees, as those mistakes delayed projects, leading to fines, low productivity and morale.

The company needed a CRM to generate email and mobile text messages alerts so that young architects could be more organized and see when a permit expires, what kind of documents and special permits are required for each type of project, how to better manage projects, improve internal communication and most importantly avoid costly delays in time and money for customers.

How the CRM implementation went?

A significant number of meetings were required as the the AIDA customization framework was developed in partnership with the architecture studio, as there were a lot of special workflows that needed to be built within the CRM platform.

In order to help younger architects better manage their projects and also ensure increased productivity by using the CRM project management module, it was necessary to create templates for each type of architectural project and so over 80 types of project documentation templates were created in the CRM.

The company also needed time to digitize the customers database, as well as training employees to trust and contribute to the configuration of the CRM. It took a total of 42 working days to complete the project.

Results after implementation

a) Customer satisfaction

The company does not keep a clear record of customer satisfaction, as most of the company's architectural projects take more than 6 months. But, as employees are using the CRM platform to avoid making the common mistakes in the past, we can assume that this will have an positive impact in terms of organizational efficiency as well as customer satisfaction.

b) Employee productivity

The implementation of the CRM is still very new for an architecture studio, where the results well be seen in a longer time span, but the preliminary results are encouraging.

There was a 10-20% increase in productivity in the first month after implementation, the companies however believes that the highest productivity possible, can happen only if besides using the CRM, local authorities will accept digital documents and online appoints, so that valuable working time will not be spent waiting at various public institutions queues, in order to submit urban documentation, such as the City Hall, the County Council, the Environmental Authority, the Monuments Authority, etc. The increase in productivity was mainly due to not making mistakes, due to lack of experience and knowing how to properly prepare the 80 types of project documentations.

CRM price and value perception

The aquisition was seen as a good and not to expensive investment, given the increase in internal efficiency for the younger architects in the company.

5. Facility Management

About the company

Founded: In 2019, in Timisoara by a young entrepreneur through a "StartUp Nation"¹ government grant.

Specialization: housecleaning for residential and offices

Background:

¹ About StartUp Nation grants: <http://www.imm.gov.ro/ro/mmaca-etichete/startup-proiect>

The company had 41 clients in 2019 from private residential areas to office spaces, which are served by 5 employees, including the General Manager who manages administrative operations and sales.

Why did they need a CRM?

In addition to high-performance cleaning machines, which undoubtedly contributed to the productivity of the 4 employees who perform day to day cleaning operations, there is also a large volume of administrative operations, such as managing appointments and responding to requests from a growing number of customers which does not leave much time for conducting prospecting activities, which is also the responsibility of the General Manager (CEO).

The company thus needed a CRM that would automate routine customer communication and be a tool for these customers in order for them to self schedule the desired visits from the facility management company, thus decongesting the appointment activity carried out by the General Manager, manager who also needs the CRM in order to manage prospecting activities for new customers.

How the CRM implementation went

The company's technical needs were easy to implement, and the project was in line with the company's long-term strategy to have the most automated and modern facility management business possible on the local market. In order to carry out the CRM implementation process which lasted 3 working days, it was necessary to have 3 online meetings between the General Manager and the CRM implementation team.

Results after implementation

a) Customer satisfaction

After CRM implementation, customers quickly got used to the online programming tool inside the CRM and appreciated the new online programming facility. However their satisfaction did not increase significantly, given that their satisfaction was rather related to the quality of the cleaning service.

b) Employee productivity

After the implementation of the CRM, the company's productivity increased by 10-20 % and there was significantly less managerial involvement in the day-to-day management of customers. The General Manager used the extra time to develop prospecting activities within the CRM platform.

Using advanced marketing tools (Mass Marketing) in CRM, such as the sending a large number of predetermined mobile text messages and e-mails, both with tracking functions, the General Manager was able to carry out more advanced prospecting activities in order to attract new customers directly through the CRM and achieve more efficient management of the sales funnel.

The CEO was also able to create automated invoices from the CRM, which were sent automatically to clients and also create automated documents, such as contracts and business offers, using document templates, which saved valuable time, time now allocated to prospecting activities.

CRM price and value perception In the first stage, the cost of the monthly SaaS subscription (Software as a Service) of 60 euros seemed expensive to the CEO, but after the CRM was implemented and the manager has seen the benefits of CRM, the price was considered appropriate.

6. Law firm

About the company

Founded: in 2016, Cluj Napoca.

Specialization: practices law in the fields of companies, insolvency, insurance, administrative and tax, consumer protection, intellectual property, telecommunications and IT.

Background:

The Law firm has 9 collaborators, and a founding member which serve a portfolio of 108 clients, from which you can find prestigious Romanian companies and personalities.

The founding member of the law firm is also a strong supporter of digital innovation in law firms, and as a result, the law firm has already tried many CRM solutions built specifically for lawyers.

The company needed a more versatile solution than AvoApp, the previous solution used which could:
synchronize lawyers' calendars in "Google Calendar".

provide a more advanced solution in terms of customer legal processes

grant restricted access to clients through a client portal within the CRM, so that they can see their own legal processes and communicate with the lawyer(s) managing their legal case.

reduce repetitive work of lawyers as much as possible by automating repetitive operations, such as sending invoices, writing commercial contracts or business offers.

How the CRM implementation went?

Since the company's founder knew in detail what a CRM is and had previous experience with other CRM solutions, the technical discussion was very straightforward.

Results after implementation

a) Customer satisfaction

Customer satisfaction did not increase, as the overall results in the courtroom are what ultimately determines customer satisfaction in a law firm. Even though customer satisfaction did not improve after the CRM was implemented, most clients recognized the implementation of the CRM as a positive aspect in terms of conducting business with the law firm.

b) Employee productivity

The founder of the law firm and the other 8 collaborators were delighted with the new CRM, which they saw as more versatile than the previous CRMs, being completely configured according to their needs.

Productivity within the company increased by 10-20 %, and most of the productivity was represented by time saved, such as time not wasted discussing unimportant issues with clients on the phone, these discussions are now taking place to some extent through the CRM's client portal, which has led to a more efficient way of communication with clients.

Productivity also increased due to the reduction of repetitive work through the use of e-mail templates and email automation, as well as the creation of document templates (contracts, business offers, powers of attorney annex, etc.) and existence of client tickets in the CRM.

CRM price and value perception

The company went for a SaaS subscription fee of 135 euros/month or 15 euros/month per user.

The monthly subscription costs 50 % more than the cost of the old AvoApp subscription, but as productivity increases in the company by 10-20 %, the company manager considers the investment a profitable one.

7. B2C Sales

About the company

Founding: in 2005 in Bistrita County, as a family business.

Specialization: business to clients (B2C) telecommunication sales subscriptions (TV, Internet, Mobile Services) in rural areas.

Background:

The telecommunications professional who founded the company, now 55, has retired from business and his son started running the company from 2014.

The company's revenues have been on an upward trend since 2005 and in 2019 reached a gross income of 2.5 million lei (aprox. 500.000 euros). The company began to expand rapidly to 30 employees in 2016, when the company signed a representation agreement with a major telecommunications player for exclusive B2C sales in Bistrita County. The agreement meant that in the rural areas of Bistrita-Nasaud there will be no other company allowed to sell the B2C subscriptions for that telecommunications company.

As the company expanded from 1 employee in 2015 to 30 employees in 2019, serving thousand of households, it became very difficult to manage expenses and coordinate the 30 employees, 15 of whom were local sales representatives.

Why did they need a CRM?

The company needed a CRM to coordinate the sales team that sold B2C subscriptions for telecommunication services, to manage the growing customer base and, in general, have better control over the operational part of the company.

As many of the 15 sales staff live in rural areas, face-to-face meetings with the manager were rare, so a CRM was needed to coordinate sales and provide support when needed.

How the CRM implementation went

CRM implementation was technically not difficult to implement, but there were issues regarding the sales team being reluctant to use the CRM platform.

Even though the project was supposed to last 4 days, a total of approximately 9 working days were allocated for the project and 2 months of extended training assistance in order to ensure that the CRM is fully understood by all employees.

Results after implementation

a) Customer satisfaction

Customer satisfaction increased by 1 point out of 5. Increased customer satisfaction was associated with the fact that the sales team's telephone dialing decreased significantly, with a large amount communication activities with customers migrating to emails and mobile text messages.

Younger customers preferring informal and digital communication options, perceiving sales calls by salespeople as an annoying and aggressive communication technique.

b) Employee productivity

After implementation and acceptance by employees, the CRM was a huge success, as employees started receiving alerts at the expiration date of old contracts for renewal purposes and automatic cross-selling campaigns were implemented. Contracts could also be generated instantly so that employees will no longer waste time writing them by hand.

The manager was able to coordinate the entire sales team and sales campaigns through the CRM "Dashboard" and was also able to carry out human resources operations, such as approving leave requests through the CRM.

After implementation, the company's productivity increased by 30-40% by automating and streamlining many sales activities.

CRM price and value perception

The monthly subscription for CRM was 300 euros per month or 10 euros / month per user. The perception of the value of the cost associated with implementing CRM is more than satisfactory,

in the opinion of the CEO, as he said in his statement: "Now that I have a CRM, I don't see the possibility of going back. I think the CRM was one of the best investments I've ever made. CEO"

8. Topography

About the company

Founding: in 2016 in Baia Mare, Maramures, County by a young geological engineer.

Specialization: geological and geodetic engineering for ground surveying, photogrammetry, cadastre and geotechnics services.

Background:

The activity started with 4 young employees in the field of geological and geodetic engineering.

Currently, the company serves an average 32 customers with 6 employees. The company registered in 2019 a gross income of around 325.000 lei (aprox. 66.000 EUR).

Why did they need a CRM?

The company needed a CRM to better communicate with customers without wasting time in numerous non productive meetings and telephone conversations.

Also, the implementation of the CRM was considered necessary to avoid the risk of employees forgetting important things such as the expiration date of an authorization approved by the city hall, a need similar to the ones seen in the previous architecture studio analysis.

A more specific need of the topographic company that justified the implementation of the CRM platform is that each team member manages around 6 projects, each employee having to prioritize those projects as best as possible, as certain types of authorization were granted. The company's management considered that the need for a CRM could help employees to identify in advance which projects should be prioritized, following through the CRM the expiring authorizations and those to be granted for various works.

The implementation process went smoothly and there was little customization involved. It took about 4 business days to configure the CRM to the company's needs, but the project was started 2 months late due to the manager's busy schedule.

Results after implementation

a) Customer satisfaction

After a period of implementation and adaptation that lasted about a month, customer calls began to be transformed into internal tickets within the CRM, customers quickly getting used to this way of working, and the company changed it's communication policy, by communicating project updates with customers directly and only through the client portal inside the CRM, customers could now track their project completion and communicate with the topography employees directly through the chat box inside the CRM client portal.

Customer satisfaction has significantly improved by 2 points out of 5 points. Increasing customer satisfaction in this case had to do with improving customer communication by creating the CRM customer portal.

b) Employee productivity

According to the manager, in addition to improving customer satisfaction, internal productivity increased by 10-20% within the company.

The increase in employee productivity by 10-20 % had to do with 2 main factors:

Clients can now receive project updates in CRM, there is no need for employees to be constantly on the phone with customers, and vice versa.

Employees receive a mobile text message and an email alert when a notice is about to expire and needs to be renewed.

CRM price and value perception

The manager considers that the monthly SaaS subscription of 75 euros was expensive, but in the end it was worth it, because CRM has significantly improved communication with customers without wasting unnecessary time in countless meetings and phone calls, which reduced risks, such as forgetting important events, like the date when an authorization approved by the mayor's office expires.

9. Medical office

About the company

Founding: in 2005 in Cluj-Napoca by a young doctor of occupational medicine.

Specialization: occupational medicine.

Background:

The company in 2019 registered 220 recurring B2B clients, a gross income of 460.000 lei (aprox. 93.000 EUR) with the help of 5 employees, of which a medical office manager, 3 occupational physicians and a psychologist.

Why did they need a CRM?

As the medical office specializes in occupational medicine, which means dozens of occupational health consulting services every day/per doctor, it was considered necessary to streamline the repetitive operations activities of the clinic manager, such as setting up consulting appointments (office and in the field) and billing activities.

In this sense, a CRM in which the appointments are made by the client and invoicing is done automatically, would lead to a lower workload of the office manager, which means more time to more productive activities.

How the CRM implementation went?

The implementation process lasted 1 month, of which 5 days of actual work for the CRM platform implementation team.

Results after implementation

a) Customer satisfaction

The medical office does not ask for feedback on a medical service provided, also the CRM was implemented more for internal reasons and not to increase customer satisfaction. The medical office only estimates that their services are perceived as good to excellent. There were no perceived changes in customer satisfaction after the implementation of the CRM.

b) Employee productivity

After the implementation of CRM, there was a significant improvement in the number of hours involved in managing customer scheduling, as well as in the time allocated to billing activities.

After the implementation of CRM, there was an increase in the efficiency of the medical office's management activity between 10-20 %, the clinic manager no longer having as much administrative work as in the past.

CRM price and value perception

At a 50 euro monthly SaaS subscription, the cost of implementing the CRM was seen as a good investment, as the productivity associated with administrative activities increased by 10-20%.

10. Software Development

About the company

Founding: in 2005 in Bucharest, in the form of a business partnership between a Romanian business woman and a French businessman.

Specialization: accounting software company

Background:

In 2019, the company reached a gross income of 6.7 million lei (aprox. 1.35 million EUR) through over 800 customers served by only 49 employees, most employees working in the maintenance and sales department. The company has two revenue streams, from the sale of software licenses and maintenance services to customers.

Why did they need a CRM?

The company had in the past implemented MiniCRM², a standardized CRM, but the implemented platform could not be adapted to generate special reports for sales and customer maintenance which have been requested by the client.

How the CRM implementation went?

The technical discussion was from one software provider to another, which is why technical aspects in regards to the CRM configuration was rapidly discussed. The actual working time for configuring the platform to the needs of the company took 15 working days.

Results after implementation

a) Customer satisfaction

Customer satisfaction increased by 1 point out of 5 after the implementation of the new CRM. Improving customer satisfaction is seen as an indirect benefit of streamlining internal work procedures, as the CRM provided more information to management about customers, the maintenance department and the sales department. With more complex data and reports, the CRM resolved internal bottlenecks and this in turn improved customer satisfaction.

b) Employee productivity

After the CRM implementation, the 30 employees in sales and technical support enjoyed an increase in productivity of approximately 5-10%.

CRM price and value perception

The CRM was offered in the form of a SaaS subscription of 450 euros per month or 15 euros per user. The company did not have a problem with the investment, being a price similar to the cost of the old CRM previously implemented.

Conclusions

After the CRM implementation, all the companies interviewed recorded an increase in productivity, as shown in Table 2.

² MiniCRM website: <https://www.minicrm.ro>

Productivity

The slightest increase in productivity of 5-10% was observed in the software developer, because it has already started to use a CRM before the implementation of the new AIDA CRM solution, which also generated some improvements in organizational performance.

Table 2. Results after CRM implementation. Source: Author

Case studiu	Field of activity	Employees	Clients	Productivity	Client satisfaction
7	B2C Sales	15	1200	30-40%	1
3	B2B Sales	8	600	30-40%	1
1	Tax consulting company	3	55	10-20%	1
4	Arhitecture studio	8	28	10-20%	0
5	Facility Management	3	21	10-20%	1
6	Law firm	9	108	10-20%	0
8	Topography	6	32	10-20%	2
9	Medical cabinet	5	220	10-20%	0
10	Software development	30	800	5-10%	1
2	Grants consulting company	20	120	5-10%	1

A slower increase in productivity was also seen in the grants consulting firm that implemented the CRM during the COVID-19 pandemic. In the case of the grants consulting firm, we believe that productivity did not increase so much during the COVID-19 period, because the CRM was implemented in the stress induced lockdown period when employees out of whom many parents also needed to take care of their children that started to study from home.

Six of the companies analyzed increased their productivity by 10-20% through a combination of automated sales and marketing workflows and the use of digital productivity tools such as tickets, control time, emails with automatic templates, automatic document generation, etc.

In the case of the B2B sales company, productivity increased significantly by 30-40 % on the operational side because most of the buy/sell orders managed by the operational manager could now be fully automated.

In the B2B sales company, productivity improved only in terms of internal operations and not in sales, with sales agents rejecting the use of the CRM platform, for fear of increased transparency and oversight by management.

The productivity of the B2C telecommunication sales company also increased by 30-40%, and the manager was able to better coordinate and supervise the sales team in the rural area of Bistrita-Nasaud. Also, the manager and sales staff could now use the advanced digital methods of prospecting and retention performed directly through the CRM.

The factors that improved the productivity of the 10 case studies ranged from extra time gained by automating administrative activities, such as the case of the medical office, or increasing organizational performance through the existence of automated sales workflows, such as the software developer and B2C telecommunications sales company.

Client satisfaction

The increase in internal productivity also increased the perception of customer satisfaction in 7 of the 10 SME's analyzed. Of the 7 companies, 6 increased their customer satisfaction rate by 1 point (out of 5), and in the case of the topography company we saw an increase in customer satisfaction by 2 points (out of 5).

The increase in customer satisfaction in the 10 case studies is due to one or more of the following factors:

Better communication with clients. In the case of the B2B sales company, the law firm, the grants consultant and the topography company, the reason for implementing CRM was to increase internal efficiency, not customer satisfaction, but increasing internal productivity and transparency between employees, indirectly impacted customers satisfaction, as customers perceived that each of those companies began to offer higher quality services, by being internally more efficient.

In the case of the topography and law firms, the only thing that changed in relation to customers was better external communication, as customers could use a customer portal inside the CRM, a portal where they could view information about the status of their projects. In this regard, we can argue that customers treat digital communication as a service that companies should provide.

Improving internal processes In the modern age, we truly live in a fast-paced world where CRMs can be an important partner for any company that wants to serve its customers better and more efficiently. By improving internal workflows, the B2B sales company, the software development company, the B2C sales company and the law firm serve their customer base better, faster and smarter due to improvements in business processes, which required both the existence of CRM-type IT platforms as well as adapting the way of doing business in the digital age, or rather the digitization of business processes.

Better - do not contact customers by phone to buy things, but rather use segmentation, strategic reporting, and customer sales history to anticipate the individual needs of each customer (a customer who buys product A is usually interested in product B; a customer usually buys a new product A after 1 year from the purchase of the previous product or similar to product A, etc). In addition, making things better means knowing and taking into account each customer's preferred ways of communicating and knowing the sales channels that these customers use. Some clients want to go to the showroom alone and do not want any form of proactive communication, others prefer to be contacted only by email, other clients are more receptive to business proposals in face-to-face meetings, etc.

Faster - in the modern world of instant gratification and with a young generation accustomed to ordering a product via E-Commerce and receiving that product within 24 hours, ordering food via a mobile app, and receiving delivery within 15 minutes, we can say for certain that customer satisfaction is becoming more and more difficult to achieve in the digital economy. Whether a CRM is used to control and adapt the business strategy to the needs of the modern customer, seen in the case of the analyzed B2C telecommunication company, or to sell products faster, such as the case of the seller of fresh tulips, we must constantly think of new ways to be faster, and CRMs are proving to be good tools in this regard, by automating repetitive work and creating digital business flows that are much faster and makes the business more scalable.

Smarter - having as much relevant data as possible about internal business processes, competition and customers in a single platform, a company can see internal problems, forecast sales, detect certain risks sooner than later (Ex: sales agents are alerting management through the CRM that they are losing customers because competition has lowered prices), capabilities needed to build a dynamic business strategy that will react and enable fast adjustments to a changing world. In the case of the software company that implemented its new CRM, they recognized the need for better data as a strategic goal, which led to better reports, that helped the management team make better strategic decisions and increase internal efficiency, which improved sales and profitability as a result.

Business workflow automation. In the case of the B2B sales company, not only did we see that business workflows allowed that company to do things better, faster, and smarter, but they used the CRM to create automated workflows, so the CRM can be able to "think and act" according to certain predefined computer rules (workflows).

In the case of the B2B sales company which has to sell imported tulips before they reach the warehouse and distribute those tulips within 24 hours of arriving at the warehouse, questions such as: "who buys the products"; "where to deliver"; "how are they paying"; "who checks payments"; "what tulips they want"; "how many tulips"; "when they need it"; "who delivers those tulips"; "Who informs customers that delivery will be today". and so on are all information that needs to be collected as soon as possible, which is why the existence of digital process automation and digital workflows can lead to the collection of all that data in a single platform, from where they can be processed automatically, and used to increase performance and even reduce operational risks.

Challenges in CRM implementation

The challenges that those 10 companies went through to implement their CRMs can be grouped into:

- **Time** - Some CRMs are easier to implement than others. In the case of companies that have a less common way of working, such as the architecture studio, they need to allocate more time and financial resources to implement an efficient CRM, given that besides time allocated for CRM implementation they also need time to digitalize their business processes, but as this paper demonstrates, allocating the time needed to think about business processes and how they can be integrated into a CRM is a worthwhile investment.
- **Resistance to change** - In the case of the B2C telecommunication company, the biggest challenge came from employees who felt at war with technology, those salespeople felt that their job was in jeopardy if the company implemented the CRM and tried to sabotage it's implementation.
- Eventually, after the implementation of the CRM, some of these employees lost their jobs, the less efficient employees being fired shortly after the implementation of CRM. In this sense, we can say that statistically most of us will change jobs in the future, as the constant advances in technology will make most traditional jobs absolute and employees will be in a constant search for jobs that produce both job satisfaction as well as a higher added value in the business world, thus hopefully reaching higher wages.

However, this is not a bleak future, as jobs will not disappear, they will only change as they had in the past as seen in the study of Tytler, Bridgstock, White, Mather, McCandless, and Michelle Grant-Iramu (2019)

Employees will need to do meaningful and valuable work in the future, just as they do today, certainly not all employees want to change the way they do things or learn new skills, but this will become the norm in the future.

- **Time to adjust** - Some employees, such as the topography company, knew they needed a CRM, but they didn't know how to use it. In this regard, workshops and tutorials were used to help the learning process. Most employees are not afraid of technology, but of things they don't know. In this sense, a software company that produces a CRM or any other business software solution must also offer educational services, so that those employees can adapt more quickly to the correct use of various business IT platforms and not become enemies of change, due to the fear of unknown.

Final conclusions

As a final conclusion for the 10 analyzed SMEs, we can conclude that with a monthly SaaS subscription between 10 and 15 euros per user or even the payment of a one time license, the investments paid off, investments that in the all of the 10 business field area brought noticeable improvements in customer relationship and a higher organizational performance, which according to the 10 managers, justified the investment.

We hope that specialized CRM's platforms will become increasingly popular in Romanian SME's, and the insights from various studied that prove both the effective implementation of such platforms and how those implementations should be treated will help managers overcome the challenges in using a CRM.

As a final conclusion, we can say that a CRM can be a competitive advantage for Romanian businesses, because CRMs, especially offered in the monthly SaaS subscription system are financial accessible digital solutions that can increase the productivity of SMEs without any significant financial risk, but the success of implementing a CRM lies in a careful analysis of business expectations and the firm commitment of managers to make the organizational changes necessary for a successful CRM implementation.

Further research

Following direct discussions with the 10 companies, as well as experience we can say that one of the most important challenges in digitizing companies in Romania has to do with correctly conducting the

internal analysis on the current state of digitization and setting achievable expectations after the adoption of various IT platforms designed to increase organizational productivity.

In this sense, as a future research, we propose the creation of an online digital audit mechanism for Romanian companies, as a self digital diagnostic tool free to use by any manager. In the future paper, this digital diagnostic mechanism will address a sample of at least 365 Romanian companies to obtain data with statistical relevance of 95% and will look into the current degree of digitization in Romanian companies and the desired direction of digitization by Romanian entrepreneurs.

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SMART GOVERNANCE IN THE CONTEXT OF SMART VILLAGES

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Abstract

Purpose – In order to close the digital divide between urban and rural digitalization development our study focuses on the impact of the smart governance concept in Romanian villages and convergence into „Smart Villages”, with its benefits and challenges.

Methodology/approach – The findings of this paper is based on a structured questionnaire conducted on mayors from 358 communes out of 2862 (12.5%) in which 9.262,851 of Romanian reside (46.05%).

Findings – The paper studies the perception of village mayors in regards to smart governance using digital technologies and convergence into “Smart Villages” in a post COVID-19 world.

Research limitations/implications – The questions addressed were not meant directly to discover smart governance readiness in Romanian villages. However, the questionnaire tackles all of the core questions that must be addressed in any Smart Governance model used in villages.

Practical implications – The Smart Governance concept refers to the use of various and innovative information technology solutions in order to improve the decision-making process in public administration, through better collaboration among different stakeholders, including government, citizens and the private sector.

Originality/value – This paper coins a definition for "smart village governance" and contributes to developing a framework for building new, smart governance models addressing the growing challenges of rural communities.

Key words: smart village

Introduction

The digitalization process of the national and global economy, accelerated by the recent COVID-19 pandemic is considered the 4th Industrial Revolution according to Skilton and Hovsepian (2018), having a major impact on private economic actors and public entities, from governments to local public administrations (Reischauer, 2018).

The recent years marked by unprecedented society changes, a new „normal” was shaped by the COVID-10 pandemic, from the „normal way” we spend our free time, interact with others and work. For this reason, the implementation of digital technologies has major consequences in the evolution of modern society, from its impact on the economy, according to Goldfarb, Greenstein, Tucker (2015), labour market (Bejakovic, Mrnjavac, 2020) and the digitalization of public services, which culminates in the Smart Governance concept, present in advanced economies around the world (Pereira, Parycek, Falco, Kleinhans, 2018a).

The Smart Governance concept refers to the use of various and innovative information technology solutions in order to improve the decision-making process in public administration, through better collaboration among different stakeholders, including government, citizens and the private sector, according to Pereira, Parycek, Falco and Kleinhans (2018b).

Smart governance moreso in the wake of the COVID-19 pandemic has an important role in supporting citizen initiatives, through providing a digital framework in which complex interactions between governments, citizens and other stakeholders can take place. In this regard, Smart Governance

according to Viswanadham, Vedula (2010) can be considered one of the 6 pillars of a true Smart Village, alongside: Smart Mobility (Docherty, Marsden, Anable, 2018), Smart Living (Asriadi, Jamaluddin, Abdullahi, 2021), Smart Environment (Aziiza, Susanto, 2020), Smart Citizen (Soon, 2016) and Smart Economy (Adamowicz, Zwolinska-Ligaj, 2020).

Compared to the other 5 Smart Village pillars, Smart Governance is primary dedicated towards digitizing and improving administrative public services, and must be directly implemented by public central and local authorities, according to Scholl and Scholl (2014).

The European Union, was the first major public institution to define a smart village as reliant on a participatory approach, or smart governance: "Smart villages are communities in rural areas that use innovative solutions to improve their resilience, building on local strengths and opportunities"¹. They rely on a participatory approach to develop and implement their strategy to improve their economic, social and/or environmental conditions, in particular by mobilising solutions offered by digital technologies"².

Smart governance approaches are now leading public administration reforms in many developed European economies, such as Austria, United Kingdom and Italy who are seeing great results in engaging citizens in participatory governance, which brings more insight on the needs of the community and many times solutions to those problems directly from their citizens (Gupta, 2008).

Authors such as Pereira et. al Pereira, Parycek, Falco, Kleinhans (2018), Eremia, Toma, Sanduleac (2017), and Winkowska, Szpilko, Pejic (2019) demonstrated that using various collaborative and transparent information and communication technologies for governing can improve internal processes, increase transparency, reduce corruption and enhance communication between public servants and citizens in cities, however there is little research on the perception, readiness and evolution towards smart governance in villages.

Our paper is focused on smart governance in Romanian villages, as an emerging field of study of the impact of digitalization in villages by using information technology in order to enhance the decision making process in village halls, and transform the way public services are delivered in the digital age. More specifically, our scope is to provide a clearer view on the perception, readiness and evolution towards smart governance in the Romanian Smart Villages of tomorrow, by conducting a smart governance survey in 358 Romanian villages, out of the 2862 village commons in Romania, in which close to 10 million citizens live, or 44% of Romanian population vs. 25% the EU average.³

The paper also aims at contributing to the development of a new smart governance model by addressing the challenges of the digital society, information sharing, citizen engagement, collaborative governance and transparency in villages, the smallest human communities that in many aspects are lagging behind cities in terms of digitization, according to Salemin, Strijker, Bosworth (2017a) and Townsend, Wallace, Fairhurst, (2015a).

Smart Villages in Romania

What are Smart Villages?

On a global level, the concept of smart villages dates back in the period of 2014-2017, with the first smart village initiatives occurring in Central Africa, Asia and South America (Holmes, 2017). In the European Union the emergence of the "Smart Village concept" is associated with the "Cork 2.0 Declaration for a Better Life in Rural Areas" from 2016 (Visvizi, Lytras, Mudri, 2019), when through a 10 points manifesto in improving the quality of life in rural areas across the European Union, digitalization and connectivity were seen as tools in order to achieve the goals set by the 10 points manifesto.

Further steps by the European Union were seen in the following year, by the European Commission's publication of "EU Action for Smart Villages" in 2017 (Stojanova, Lentini, Niederer, Egger, Cvar, Kos,

¹ Concept, issues and prospects for EU rural areas: [https://www.europarl.europa.eu/RegData/etudes/BRIE/2021/689349/EPRS_BRI\(2021\)689349_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/BRIE/2021/689349/EPRS_BRI(2021)689349_EN.pdf)

² Concept, issues and prospects for EU rural areas: [https://www.europarl.europa.eu/RegData/etudes/BRIE/2021/689349/EPRS_BRI\(2021\)689349_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/BRIE/2021/689349/EPRS_BRI(2021)689349_EN.pdf)

³ Ziarul Financiar articol: 44% of Romanian live in rural areas: <https://www.zf.ro/eveniment/circa-44-din-populatia-romaniei-traieste-in-mediul-rural-media-uniunii-europene-este-de-25-14918560>

Duh, 2021), where the E.U. defined policy areas and funds for smart villages, adopting an integrative approach towards them (Zavratnik, Kos, Duh, 2018).

Smart villages don't have a legal definition in the national or E.U. legislation, but they are the villages that usually stand out in the rural landscape by being aware of rural issues and open to adopting innovative solutions. They share a positive and interested attitude towards digitalization, by being eager to adopt digital innovations and having digital skills, be it technical, organizational or communicative skills, which is in contrast to the more traditional and many times reticent to innovate rural communities (Zerrer, Sept, 2020)

Smart villages are the most innovative villages in a country, innovation that is given by the implementation of various public sector digital platforms and technological solutions, which accompanied by a modern way of thinking about public services and public servants brings many benefits to citizens from rural areas and closing the gap between the urban-rural digital divide according to Saleminck, Strijker, Bosworth (2017b).

Research methodology

In partnership with the Association of Romanian Communes (ACOR) we have conducted a quantitative study by sending a structured questionnaire, addressing important questions in relation to digital development in Romanian communes via email, directly to the members of the ACOR, comprised of mayors from 2862 village communes, which accounts for 87.13% of Romania's landmass and 9.262,851 of its residents (46.05%).⁴

Out of the 2862 communes, we have received answers from 358 communes, which represents a response and representation rate of 12.50% from the total number of communes in Romania, which brings a statistical significance of 95%, with a margin or error less than 5% to our study.

The questionnaire was constructed by the authors of this paper, in consultations with Mr. Sergiu Tara, Executive President of ACOR and Mr. Damian George, Vice President of ACOR and Mayor of Ciugud Village, Romanians first Smart Village⁵, with the scope of discovering the level of rural digitalization readiness and usage of the most basic digital software solutions in order to develop a "Smart Village and Smart Governance Guidelines for Romanian villages" which aims at supporting Romanian villages in their transition towards smart villages and smart governance.

It's important to note that the questions addressed were not meant directly to discover smart governance readiness in Romanian villages, but the overall convergence of Romanian villages towards the smart village model. However, the questionnaire tackles all of the core questions that must be addressed in any Smart Governance model used in a village common, such as Service improvement, Administrative efficiency and Citizen centrality, all supported and enhanced by ICT.

Romanian villages

The respondents of our study, which has a statistical significance of 95%, and a margin or error less than 5% are diverse, such as the rural landscape in Romania.

As seen in Table 1, the majority of village commons to our survey, comprising 67.32% have 11-25% public servants, followed by 20.11% of villages with 26 – 50 public servants and 9.78% with 1 - 10 public servants.

Table 1. Number of village hall public servants

Public servants	Responses	Percentage
1 - 10	35	9.78%
11 - 25	241	67.32%
26 - 50	72	20.11%
>60	11	3.07%

⁴ ACOR members: <https://www.acor.ro/comune-membre/>

⁵ Ciugud, the first Romanian Smart Village: https://adevarul.ro/locale/alba-iulia/o-comuna-ardeal-devenit-exemplu-bune-practici-polonia-romanii-vor-exporta-conceptul-smart-village-1_6159aba25163ec4271ee1e47/index.html

According to Table 2, 60.89% or most village commons in Romania are middle size with 2001 - 5000 residents, followed by smaller commons up to 2000 residents (22.35%). Large rural communities, are usually found at the outskirts of cities and comprise 16.75% of total village commons, with communities with 50001-8000 inhabitants (12.57%) and with more than 8000 residents (4.19%)

Table 2. Number of citizens in the village common

Nr. of citizens	Responses	Percentage
1 - 2000	80	22.35%
2001 - 5000	218	60.89%
50001 - 8000	45	12.57%
>8001	15	4.19%

Digital strategy

Until recently, in Romania having a digital strategy was seen as a necessity only in cities, and even so we have instances where cities don't yet have a coherent digitalization strategy in place. This is important to mention because villages and villagers alike are looking at cities for inspiration in regards to how a digital rural community and local administration should look like.

As until recently villages in Romania didn't have a complete working example on how a digital strategy can be implemented in rural communities and which are the quantifiable benefits of its implementation, we can see that according to Table 3 only 6.98% of villages have a clear digital strategy in place in order to develop themselves into smart villages.

Table 3. Digital strategy development in Romanian Villages

Existence of a digital strategy	Responses	Percentage
There is a clear strategy	25	6.98%
There are some ideas	199	55.59%
No	110	30.73%
I don't know	24	6.70%

It is however encouraging to see that 55.59% of Romanian villages have some ideas on how their commune could benefit from ICT and ultimately be transformed into a smart village, meaning it's only a matter of time for them until a clear digital strategy framework will be defined.

For the rest 37.43% of Romanian villages, out of which 30.73% don't have any ideas in developing a digital strategy for their community, and 6.70% don't know what a digital strategy implies, it's important to note that the Smart Village concept is still a very new one in Romania and until recently there were not many public funds destined for supporting digitalization projects in villages, neither a clear demand from citizens in rural areas, as many villages in Romania are still lacking a good road infrastructure, sewerage and water systems, and understandably you cannot think about a smart village if the commune doesn't have access to the most basic living amenities.

As the vast majority of village mayors (77.93%) are saying that 70% or more of village hall activities can be digitalized (See Figure 1), we can assume that after the necessary investments in road infrastructure, sewerage and water systems take place, digital investments will follow, and more of the 37.43% of Romanian villages with no digital strategy will start developing and ultimately implementing one.

It's also encouraging to see that the most common preconception that villages are reticent to adopt digital solutions is wrong, as seen in Figure 1, the majority of villages are familiar with the ways digitalization can positively impact their community, and so the slow adoption of digital solutions in villages if compared with cities is not about reluctance towards digitalization, but mostly to do with other factors, as seen in Figure 2.

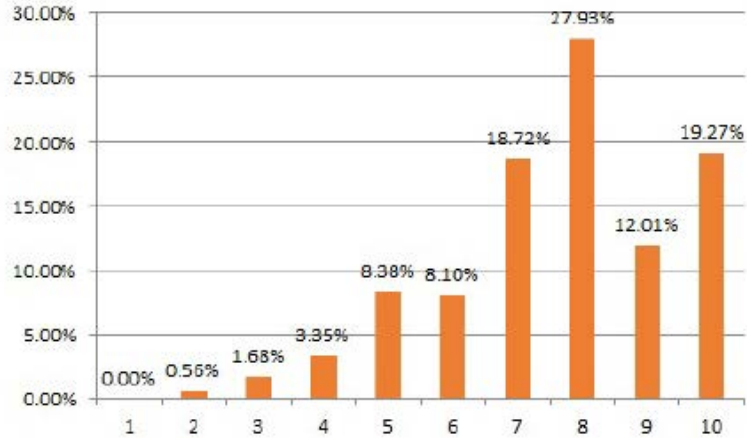


Fig. 1. The extent to which the activity of the Village Hall can be digitized

According to Figure 2, digital literacy of village hall public servants is seen as the main digital transformation impediment by 72.35% of mayors, followed by not enough public servants or time towards digital projects (37.43%), insufficiency hardware devices (32.30%), workstations (19.83%), bad or non existent internet connection (12.29%) and insufficient mobile devices (9.22%).

Internet connection in the modern age contributes to the sustainability of rural life Townsend, Wallace, Fairhurst, (2015b), and as Romania has one of the fastest and cheapest broadband internet connections in the world⁶ is in strong contrast with other developing nations, where poor broadband infrastructure is the main impediment for developing the digital infrastructure (Yates, Gulati, Weiss, 2011), (Pentland, Fletcher, Hasson, 2004), as in Romania bad or non existent internet connection (12.29%) is one of the smallest digitalization impediment faced by villages, according to Figure 2.

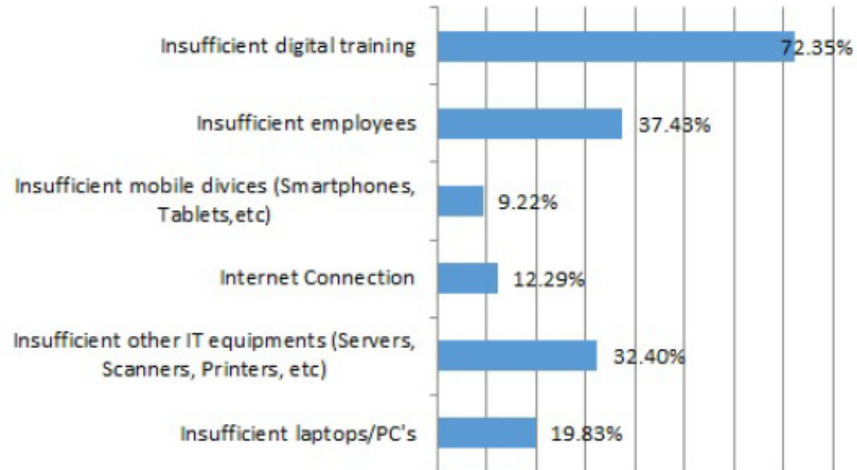


Fig. 2. Which of the following factors are an impediment in the digitalization process

In terms of who is the main coordinator in the digitalization process, as seen in Table 4, in 31.56% of cases, we have a dedicated public servant or more than one (24.86%) , followed by external consultants with 21.79%, and ultimately the mayor with 20.39%, dismantling the common belief that the village mayor who most times is the driver of digital transformation, as a policy maker is also the coordinator of the digital transformation process.

⁶ Connectivity Studies 2021: <https://digital-strategy.ec.europa.eu/en/policies/desi-connectivity#ecl-inpage-kvv2e3tf>

Table 4. Who can coordinate the digitization process in the village hall

Who coordinates the digitization process	Responses	Percentage
Mayor	73	20.39%
One employee of the village hall	113	31.56%
More then one employee of the village hall	89	24.86%
External consultant	78	21.79%
No one	5	1.40%

Service improvement

Due to the COVID-19 pandemic, we have seen an acceleration of central and local taxes that could be payed online⁷ this is also the case in villages, as seen in Table 5 where 33.50% of them already accept banking methods, through "Ghiseul.ro" the national fee and taxes platform, or local digital solutions in which citizens can pay their local taxes online.

Table 5. Can citizens pay their local taxes online?

Paying taxes online	Responses	Percentage
Yes	120	33.50%
No, but we want to	176	49.20%
No	62	17.30%

The trend of using digital payment solutions for local taxes is expected to accelerate in the following years, as 49.20% of village halls that don't yet provide means of paying local taxes online, do want the implementation of such systems.

In the case of the 17.30% of villages that don't have and are not yet interested in developing solutions to let citizens pay their local taxes online, we can assume that one of the digital impediments enumerated in the previous Figure 2 are causing this situation.

In Romania, also helped by the COVID-19 pandemic, 35.47% of villages already use e-registrations forms and online appointments, as seen in Table 6, and other 39.39% of villages are interested in e-registrations forms and online appointments, only 25.14% of villages don't see a necessity for such applications.

Table 6. Do you use applications to receive online notification, documents, appointments, etc.?

Receiving notifications, documents, appointments online	Responses	Percentage
Yes	127	35.47%
No	90	25.14%
No, but we want to	141	39.39%

In the digital economy and digital age, cybersecurity and data protection must be an implied service provided by all institutions and for all public service, this is not a desideratum, but in fact the law that villages must also abide by.

As seen in Table 7, it's concerning to see that 61.50% of Romanian villages don't use an official email address to communicate with citizens and most importantly securely store their personal information, which according the G.D.P.R. law, also in effect in Romania, implies that all institutions and private companies from the European Union must guarantee the safely of citizen private date, this cannot be done by using personal email addresses, as the village hall doesn't have control over them and cannot monitor and secure the official communication between public servants and citizens.

⁷ Delloite report: <https://www2.deloitte.com/ro/ro/pages/about-deloitte/articles/expertii-deloitte-criza-a-accelerat-digitalizarea-dar-incertitudinea-si-lipsa-de-transparenta-vor-afecta-in-continuare-mediul-de-afaceri-urmeaza-informatizarea-administratiei-fiscale-si-intensificarea-controalelor-in-zone-de-risc.html>

Table 7. Are village hall public servants using an official email address?

Using an official email address?	Responses	Percentage
Yes	138	38.50%
No, but we want to	89	24.90%
No	131	36.60%

In this case, we are not talking about a lack of financial funds for enabling the use of official email addresses, as such costs are minimal, but an underestimation or a lack of knowledge on the dangers of cyber crimes, theft of personal data and importance of using official email addresses for safeguarding citizen private data, as seen in the requirements of the law no. 190 from 2018 on measures to implement in order to comply with E.U. directive 679 from 2016 in regards to the general data protection regulation (GDPR)⁸. This however is not only a problem that only villages must comply to, but also a responsibility from the Romanian State to enforce the GDPR law in all institutions.

Table 8. The use an application for electronic and document management

Electronic registration and document management system	Responses	Percentage
Yes	151	42.18%
No	103	28.77%
No, but we want to	104	29.05%

Administrative efficiency

The most common administrative efficiency digital solution found in Romanian villages are those related to electronic registration and document management systems (DMS), where 42.18% of villages are already using them, 29.05% being interested in their implementations and 28.77% with no interest in the matter.

The recent interest of Romanian villages in adopting electronic registration and document management systems has also to do with the development of such solutions from companies like „Registra”⁹ on a "Software as a Service" model (SaaS), where village halls are paying a yearly subscription fee to access those digital solutions, making the technology more affordable in the short term, as villages don't have an acquisition cost.

Digital administrative solutions, such as those developed by Registra for more than 750 cities and villages across Romania¹⁰ are highly standardized digital solutions destined for city and village halls, as an integrated e-governance solution, with modules such as: electronic registration, document management, citizen tickets, electronic forms, online complaints or requests, online appointments, online payment management, citizen portal, automatic publication of public information, managing third party software solutions (smart meters, parking systems, street lighting, etc), however few villages are using all the modules of a such advanced digital administrative solution¹¹.

One of the most common ways a document management system improves efficiency in the public administrations is by tracking workflows and documents, which is the case of 25.42% of villages who implemented such applications and other 37.43% that are interested in their implementation, as seen in Table 9.

Table 9. Application for tracking workflows and documents at the village hall

Using applications for tracking workflows and documents	Responses	Percentage
Yes	91	25.42%
No	133	37.15%
No, but we want to	134	37.43%

⁸ GDPR law applied in Romania: https://www.dataprotection.ro/?page=Legea_nr_190_2018&lang=ro

⁹ Registra DMS Software solution: <https://registra.ro/>

¹⁰ Registra DMS Software solution: <https://registra.ro/>

¹¹ E-Governance ICT solution from Registra: <https://registra.ro/#mol>

Tracking workows and documents can be offered as a module in the more complex electronic registration and document management system, or be offered as a standalone solution, which however doesn't have the complexity of a fully e-governance digital solution.

Keeping track on inventory items brings a new meaning through the use of a digital platform, or mobile device, as citizens can improve village asset management by sending notifications to the village hall, such as intervention requirements if the utility infrastructure (electricity, lights, etc) is malfunctioning, or requirements, such as connecting to the utility network, which can be processed into digital workows thorough the use of a tracking workows and documents system.

As seen in Table 10, in the case of 24.86% of villages, such systems already exists in various digital forms, while other 41.90% of villages are interested in using them. In these instance, administrative efficiency is improved by having better asset management capabilities, as communication with citizens is improved by ICT solutions.

Table 10. The use of application for inventory/asset management

Using an inventory/asset management application	Responses	Percentage
Yes	89	24.86%
No	119	33.24%
No, but we want to	150	41.90%

Citizen centricity

Citizen centricity starts with transparency, which implies free and unrestricted access to any information of public interest, as defined by law no. 544 from 2001, meaning access to: the organizational structure, the attributions of each department, the functioning program, the audience program of the village hall, contact details of the public authority, financial statements, etc¹².

According to Table 11 the way 92.70% of village halls are complying with this law is by publishing that information and documents through their official website, and 7.2% of them are probably still using a notice board, which by our modern understanding of free access to public information is not sufficient. It is however worth mentioning that out of the 7.2%, 6.1% of villages want to develop an official website.

Table 11. Do you have an official village hall website?

Official website	Responses	Percentage
Yes	332	92.70%
No, but we want to	22	6.1%
No	4	1.1%

In terms of how a citizen centric approach must be seen at a rural level, is by having a clear insight on the needs of the community and many times we are seeing that the needs of the citizens are in relation to subordinate village hall intuitions, such as the public library, village school and sports facilities.

In Figure 3 we are seeing the beginning of citizen centricity in villages, as discussions are starting to emerge on the needs of developing digital systems such as online public library (29.89%), public gym appointments (25.99%) and school grades management solutions (25.70%), type of solutions that involves a higher knowledge of citizen needs and a tighter citizen-village hall partnership in governance, which according to Figure 3 is only in it's early phase, but the idea of participatory governance and citizen centricity is starting to get momentum, as seen in Table 12.

¹² Law regarding access to public information: <http://legislatie.just.ro/Public/DetaliiDocument/31413>

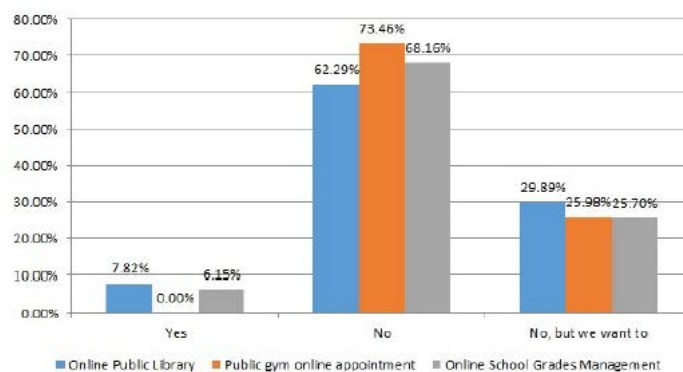


Fig. 3. Do you have the following applications at subordinate institutions?

One of the most encouraging findings of our study is that village halls are overwhelmingly in favor (89.66%) of participatory governance and tools to develop social and civic dialogue with citizens and NGO's, as seen in Table 12.

Table 12. Do you consider it necessary to develop tools for interaction between NGOs/social partners and public administration authorities and institutions in order to encourage social and civic dialogue?

Answer	Responses	Percentage
Yes	321	89.66%
No	33	9.22%

Only time will tell us how many of those 89.66% forward thinking villages will embrace citizen centricity and participatory governance, not only in concept, but in practice, practice that also implies a higher local civic spirit and active role of citizens in the village hall decision making processes.

Conclusions

Challenges in becoming a Smart Village

1. Digital strategy planification

Defining some ideas of tackling local development issues with the help of ICT, into a coherent digital strategy is a challenge for most Romanian villages, as seen in the previous Table 3, where we see that only 6.98% of villages developed a digital strategy.

Moreover, as a quarter of Romanian villages don't have access to a sewage system or access to other basic utilities¹³, defining a digital strategy might be of a low priority, until basic village infrastructure is developed.

2. Digital literacy

As the main impediment (72.35%) of creating a digital strategy, identified by the mayors in our study, as seen in Table 4 is the digital literacy of public servants, measures must be taken in order to develop solutions that can not only increase the digital literacy of public servants but of rural citizens as well, Romania, according to the latest DESI report from 2021 being a country of extremes, with the highest percentage of ICT graduates per capita in the European Union, of 6.3% of total graduates vs. 3.9% the U.E. average, but also with one of the populations with the lowest above basic digital competencies, of 10% vs 31%, the E.U. average¹⁴.

¹³ Eurostat report on indoor using toilet: <https://ec.europa.eu/eurostat>

¹⁴ DESI Report from 2021: <https://digital-strategy.ec.europa.eu/en/policies/desi-romania>

3. Demographic crisis

By 2050, Eurostat estimates that 25% of Romania's rural population will disappear¹⁵. According to the latest statistics, villages are rapidly depopulating in Romania, people moving to cities or emigrating in other E.U. countries in search for better employment opportunities and standard of living.

In Romania living in a rural area is seen as having less opportunities and a lower standard of living than in cities, which are the main causes of depopulation.

However, if, such as the case of Ciugud village (See Chapter 4) access to the living amenities are improved (good roads, sewage and water system, etc.) and better employment opportunities are provided in villages, those demographic trends can be expected to change for the better.

4. Funding for digital change in rural areas

One of the reasons many villages postponed the discussion about digital strategy had also to do with available funding for the digital transformation in rural areas, as the European Union only launched "EU Action for Smart Villages initiative" in 2017¹⁶ and the Romania government only started promoting smart villages strategies starting from 2020¹⁷. As funding for digitalization strategies will start to emerge, so will the village interest increase in pursuing digital transformation strategies.

Challenges in adopting the Smart Governance model

Convergence towards smart villages The village convergence towards a smart governance model implies not only a greater openness of governance and citizen centricity, but also the implementation of ICT solution that help keep citizen engagement high, by providing a means of communication and a more efficient method at enhancing transparency and trust in a digital enabled participatory governance model.

In these sens, even if the minimum technical requirements of providing a e-governance framework can be summed up by adopting a complete electronic registration and document management systems (DMS), as described previously, smart governance is only enabled by such digital solution, not driven by them.

The main driver of change being the village hall and their public servants that must plan in advance such paradigm shifts in governance, planning that must be drawn up beforehand in a coherent digital smart village strategy, which for many villages pose a challenge, whether it's because of a lack of digital literacy, funding for digital transformation or other impediments.

As seen in Table 12, 89.66% of village mayors are overwhelmingly in favor of a more open social and civic dialogue with citizens and NGO's, but as citizen centricity implies governmental transparency, which brings greater accountability and reduces corruption, it's idealistic to think that such changes can occur without any resistance from public officials.

Only time will tell us how high transparency resistance will be, and in which form it will manifest itself, because resistance can also mean blocking the interoperability and sharing of public sector data, which not only makes governing and public services more efficient and transparent, but also more accountable (Pina, Torres, Acerete, 2007).

Final conclusions

Although the concept of smart governance in the context of smart villages is fairly new, the concept, with it's two core elements, of involving the local community and the use of digital tools in order to develop and enhance public servants and citizens partnership in governance, for the ultimate goal of achieving participatory governance, is beginning to gain traction and support is starting to emerge from

¹⁵ Population change in the E.U. <https://ec.europa.eu/eurostat/web/products-eurostat-news/-/ddn-20210520-1>

¹⁶ EU Action for Smart Villages: https://ec.europa.eu/info/sites/default/files/food-farming-fisheries/key_policies/documents/rur-dev-small-villages_en.pdf

¹⁷ Ciugud is becoming a case study for implementing the Smart Village concept in Romania:<https://zi-are.com/stiri/eveniment/comuna-ciugud-din-alba-devine-studiu-de-caz-in-romania-pentru-conceptul-de-smart-village-ministru-vom-propune-ca-ideea-de-sat-inteligent-sa-devina-program-national-1618743>

the Romanian State, the European Union, and ACOR, which helped the researches of this study through consultations and access to the 358 village mayors of this study.

As the paper shows, village mayors recognize the benefits of digitalization in raising efficiency, as 77.93% of them are saying that 70% or more of village hall activities can be digitalized (See Figure 1) and 89.66% of mayors are overwhelmingly in favor of social dialogue with NGOs/social partners (See Table 12), it is therefore an immediate opportunity to seize this momentum and find solutions to the widest common impediment that village halls face in the adoption of ICT solutions which according to Figure 2, is represented by digital literacy of village hall public servants.

Having digital literate public servants will not only lead to the adoption of digital solutions in order to improve services, administrative efficiency and enabling a digital citizen-centric approach, but also represents a matter of reducing national security risks.

In terms of national security risks, most Romanian villages (See Table 7) don't know the dangers of cybercrimes and the most basic forms of cybersecurity, which is seen in the fact that 61.50% of them don't even use official email addresses in their communication with citizens and most importantly don't securely store the personal data of those 9,262,851 Romanian citizens (46.05%) living in rural areas.¹⁸

If a digitalization guide or framework for smart villages coupled with digital workshops are not provided to village halls in Romania in the following period, we may see a growing resistance to digital transformation, which will certainly lead to a poor absorption of the European funds destined for smart village projects and a wider urban-rural digital divide.

In the end, ICT only enables and does not drive the smart governance model in villages, as the true "SMART" component in any community remains its people, who can be drivers, supporters and users of digital-enabled solutions, which builds on local strengths and opportunities in order to improve citizens' quality of life and engagement in governance.

It is therefore of utmost importance that the Romanian State, the Association of Romanian Communes and other relevant NGOs work together in order to increase digital literacy in villages, both in public servants, as well as citizens.

Future research directions

As the study found out that the main impediment in developing a coherent digital strategy in Romanian villages is represented by digital literacy of public servants, based on our current findings and in partnership with Holisun, an IT R&D Romanian company¹⁹ and the Association of Romanian Communes we will develop the first "*Smart Village and Smart Governance Guidelines for Romanian villages*", after consultation with a focus group compiled of the most digitalized 30 Romanian villages that will take place in 2022. The following paper will present the results of implementing the "*Smart Village and Smart Governance Guidelines for Romanian villages*" through a set of digital literacy indicators that will be collected before and after the guidelines are implemented in villages that will be part of the project.

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POST COVID-19 CHALLENGES AND PERSPECTIVES FOR A SUSTAINABLE FASHION RETAIL- CASE FROM ROMANIA

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Abstract

Purpose – This study is carried out to analyze the impact of COVID-19 on the fashion industry, and the opportunities for growth in the actual turbulent environment.

Methodology/approach - The methodology followed for this study involves a review of related literature and a quantitative online survey. Both primary and secondary data were collected for this study. Primary data was collected through 276 questionnaires, and the secondary data was gathered through internet search from research results from national and international statistical reports.

Findings – Second-hand clothes shopping becomes an alternative for responsible consumption, towards a circular economy, as an opportunity for fashion retail diversification. The reuse of textiles is a niche activity and is less costly than upstream initiatives to change the design, and production from a circular economy perspective.

Research limitations/implications – The limitations of the study are that the sample was restricted to the region of Central and Nord-West Romania.

Practical implications – Results of this study could be used by different actors – such as retailers, fashion designers, and education institutions, focusing on engaging consumers in active roles that foster Circular Economy success.

Originality/value – The study fills a gap in the literature on the subject of sustainable fashion in Romania.

Key words: Circular economy, fashion industry, second-hand clothes shopping (SHCS)

Introduction

The fashion industry was one of the hardest affected by the COVID-19 pandemic which led to the temporary closure of traditional physical stores around the world and made people stay home longer and stop spending money on clothes, shoes, and fashion accessories. (Zhao, 2022)

Unfortunately, the new SARS-CoV-2 variants (EDCE,2022), the monkeypox (Kozlov,2022), and the invasion of Ukraine do not predict the recovery of the industry as we use to know it soon. With decreased disposable income (e.g. inflation) and other external factors (e.g., lockdowns), consumers will be more aware and will chose to spend less on apparel, reduce discounts and impulse purchases. Consumers substantially use to reduce their spending on fashion during uncertain economical condition, quickly identifying clothes, shoes, and fashion accessories as a 'non-essential' category of consumer goods. (Aurora et al, 2020). In addition to the economical state, due to environmental concerns, more and more customers are considering the larger impact of their consumption on other people, animals, or the environment (Pereira et al, 2021). This type of consumer either decides to buy less clothing and bases his fashion consumption on strict necessity; either they move towards circular economy models and decide to extend the life cycle of clothing products among the methods used being the purchase of second-hand clothing.

The structure of this paper is divided into three parts: (1) Literature review; (2) Methodology; (3) Findings and conclusions. The literature review enables a general view of the fashion industry, second-hand clothing, and consumer behavior related to second-hand shopping. For the methodology, a quantitative

analysis is done in the form of an online survey using a questionnaire applied to a sample of 276 young fashion customers. All data will be discussed in the chapter on findings and conclusions.

Literature review

The Covid-19 pandemic has changed consumer behavior. With the uncertainty of the situation, consumers have concentrated on their basic needs and purchasing mainly essential products (Lopez and Quattara, 2021). Therefore, the fashion industry recorded a 20% decline in revenues during 2019–2020. As the SARS-CoV-2 pandemic continued to run its course, the performance inequalities that have become a challenge over recent years were more in evidence than ever. According to the latest report of the McKinsey Global Fashion Index (McKinsey, 2022), a record of 69% of companies reported a drastic decline in 2020, compared with 61% in 2019 and only 28% in 2011. About 7% of companies left the market either due to financial distress or because they were acquired by competitors.

According to McKinsey (2022) the main opportunities for the growth of the fashion industry are digitalization and consumer engagement while supply chain pressures will challenge the industry in 2022. Sustainability is considered both an opportunity for growth and also challenge. More than ever, sustainability is dominating consumer priorities and the fashion agenda. There is a rising customer interest in second-hand retail stores and platforms to buy fashion products (Evans et al, 2022). Second-hand shopping, involves buying products previously owned or used, and then sold, typically for lower prices than new and is one of the most sustainable ways to shop. It is a popular trend in fashion, especially among young people, because of ethical and environmental concerns and among older generation because of economical reasons (Wiederhold and Martinez, 2018). It is becoming a global phenomenon, expected to grow 127% by 2026. (ThredUp, 2022)

According to ThredUp (2022) the global second-hand apparel market will grow 3 times faster than the global apparel market overall. The number of second-hand stores is growing as stigma of being associated with the lower-income class and barriers to second-hand shopping decrease (Zaman et al., 2019), as the consumer and the second-hand online market is expected to grow from 7 billion USD in 2019 to 36 billion USD in 2024. (Smith, 2022).

From eliminating manufacturing pollution to closing the loop and eliminating the need for unsustainable materials, secondhand fashion promotes a circular economy. In recent years big fashion retailers like H&M, ASOS, and Urban Outfitters enter the secondhand space.

Sustainability in retail has become an important subject leading retail trends through its relevance across a wide range of fields (e.g. environmental sciences, business, and social sciences) and terms (e.g. sustainable development, sustainable supply chain, supply chain management, and corporate social responsibility). (Ruiz-Real et al, 2018)

The main types of retailers of secondhand fashion are traditional brick-and-mortar stores with physical locations, for profit (retail or consignment stores) or non-profit retail outlets stores (thrift shops), open markets, and online platforms.

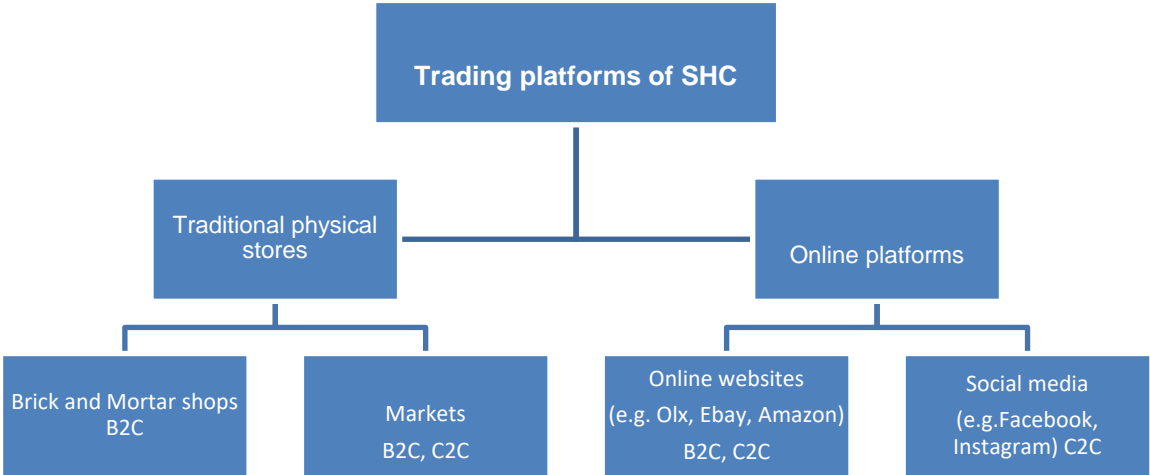


Figure 1. Trading platforms for second-hand clothing (SHC) Source: by authors

The advantage of brick-and-mortar stores (including thrift stores and consignment stores) is that customers can visit, buy, and interact with the products. Fashion products sold in thrift stores usually have superior quality to the fast fashion currently produced (Edbring et al., 2016).

Open markets, including street markets, or flea markets are organized gatherings of individual stalls selling unique and unpredictable secondhand objects. The advantage is that the customers can interact with the products, negotiate and then buy.

Online stores are e-commerce platforms selling a vast range of items, and offering users the possibility to search and buy (B2C) or to buy or sell and interact with others through the platform (C2C). The spreading of C2C contributed to the development of second-hand products markets, like online auction-based sites e.g. eBay, and Amazon (Liao & Chu, 2013) or the websites that allow private people to trade (buy and sell) goods online e.g. OLX, eBay, Sellpy, Remixshop, etc.

In Romania, the most present are the privately-owned, for-profit businesses stores that resell clothes imported from the main western markets (Great Britain, Germany, Holland). (Cuc, 2016)

Methodology

Analysis of statistical reports and a quantitative research method were applied for this study. We provide an overview of the immediate impact of COVID-19 on the fashion industry based on a qualitative analysis of recent statistical data. To investigate why some consumers embrace, and others avoid, second-hand shopping (Edbring et al., 2016, Ferraro et al., 2016) and also to study consumer shopping behavior across physical secondhand store formats, and online platforms a quantitative online survey of young people was administered.

An online questionnaire study was conducted in June 2022. This study chose young educated adults aged between 18 and 40, living in Central and West Romania as the primary data source. An online self-administered questionnaire was selected as the data collection method. The survey, created on Google Forms, was distributed on diverse social media platforms (Facebook, WhatsApp) whereby respondents were asked to redirect the questionnaire to people corresponding the desired sample characteristics. The questionnaire was designed based on the previous literature and was pre-tested and redesigned through a sample of 10 bachelor's and master's students by undertaking the pilot study work (Ropa and Rani, 2012).

To explore how consumer orientations differ in terms of secondhand shopping frequency and secondhand retail platforms, participants were asked to indicate their interest in secondhand clothing and if had ever purchased secondhand, the frequency with which they buy, and the type of stores they buy from. To reduce socially desirable responses, participants were informed that the anonymity of their responses was guaranteed, and their answers will be treated as confidential and will be only used for academic purposes.

Discussion and conclusions

Romania produces clothes, textile fibers, and footwear worth 18.3 billion lei (3.7 billion Euro) annually. In 2021, the industry lost 3.7 million lei in turnover. In 2021 the clothing sector marked a 53,79% decrease compared to 2020 and the footwear sector decrease with 45,46% (RISCO,2022). In terms of the number of companies, almost 750 have vanished from the statistics. The fashion sales sector suffered less, around 6.3% (2020), and for 2022 the retail sector is expected to return with a slight increase of around 3% to a value of around 2.35 billion EUR. Footwear retail saw the biggest drop (-24%), followed by the biggest increase (+10%) post-pandemic.(MKOR,2022). The economic crisis aggravated by the two years of SARS-CoV-2 pandemic, the energy crisis, inflation, and the war in Ukraine may have a significant impact on clothing consumption practices, due to the decrease in the purchasing power of a large part of the Romanian population, resulting in increased demand for products with more affordable prices.

Table 1 shows the basic characteristics of the consumer surveyed. Out of the 276 respondents surveyed, 187 (67.75%) were female and 89 (32.25%) were male. Out of the total surveyed consumers, a substantial proportion, 48 % of the respondents were between 30 to 40 years of age. The educational profile of the respondents' shows that most of them are bachelor's or master's students (75%). The high

percentage of respondents with income below the minimum wage in the economy (about 25%) is given by their student's status; not reflected necessarily a precarious social situation.

Table 1. Sample characteristics

Sample characteristics		Frequency	Percentage	Never by SHC		
				Frecvency	Percentage	Percentage
Gender	Male	89	32.25	17	19,1	11,23
	Female	187	67.75	14	7,5	
Age group	18-25	105	38.04	10	9.52	
	26-30	39	14.13	3	7.69	
	31-40	130	47.10	18	13.85	
	40+	2	0.72	0	0	
Education	High school students	128	46.4	15	11.72	
	University-Bachelor	83	30.1	7	8.43	
	University-Master	56	20.3	6	10.71	
	University-Doctoral studies	9	3.3	3	33.33	
Net monthly income	Less 1500 lei * (cca 300 Euro)	71	25.72	4	5.63	
	1501-3500 lei (300-700 Euro)	121	43.84	10	8.26	
	Above 3500 lei (700 Euro)**	84	30.44	17	20.24	

*minim wage on economy

**medium wage on economy

The results revealed that 28.26% of the surveyed sample buys SHC clothing regularly, 28.62% occasionally, 31.89% rarely while only 10.5% never buy it. There is a higher interest in buying SH clothing among women, and among people in the 30-40 age group. This result is somewhat in line with world statistics, according to which 46% of American women aged 18-37 (generations X and Z) usually buy SH fashion (Smith, 2022). As the income is higher, the percentage of those who never buy SH products increases.

The subsequent analyzes included only the respondents who declared themselves consumers of SHC. The results show, that customers consider the seller's location as an important factor when he decides to buy second-hand fashion. Table 2 indicates that most of the consumers prefer brick-and-mortar stores and the majority (55.5%) never buy SHC online. Comparatively, men are the ones who buy online more than women. Online shopping requires some buyer's competencies (knowing how and where to shop online), access to infrastructure (internet, delivery infrastructure), and trust in the sites and offers (consumers are not able to try, feel or touch the products). The survey results yielded no significant difference between female and male respondents regarding open markets SHC buying. Table 3 presents the frequency of purchase of SHC on different platforms by different income groups.

Table 2. Shopping platforms preferred by Romanian SHC buyers

	B&M Stores					Flea Markets					Online Stores				
	Frecvency (N=245)		Percentaj %			Frecvency (N=245)		Percentaj %			Frecvency (N=245)		Percentaj %		
	M	F	M	F	m	M	F	M	F	m	M	F	M	F	m
Always	1	11	1.39	6.36	4.9	2	6	2.78	3.47	3.3	2	1	2.78	0.58	1.2
Often	14	51	19.44	29.48	26.5	9	20	12.50	11.56	11.8	4	4	5.56	2.31	3.3
Sometimes	24	50	33.33	28.90	30.2	28	43	38.89	24.86	29.0	13	31	18.06	17.92	18.0
Rarely	30	56	41.67	32.37	35.1	27	61	37.50	35.26	35.9	20	34	27.78	19.65	22.0
Never	3	5	4.17	2.89	3.3	6	43	8.33	24.86	20.0	33	103	45.83	59.54	55.5
	72	173	100	100	100	72	173	100	100	100	72	173	100	100	100
σ	5.84	53.51				10.29	13.98				22.21	60.11			

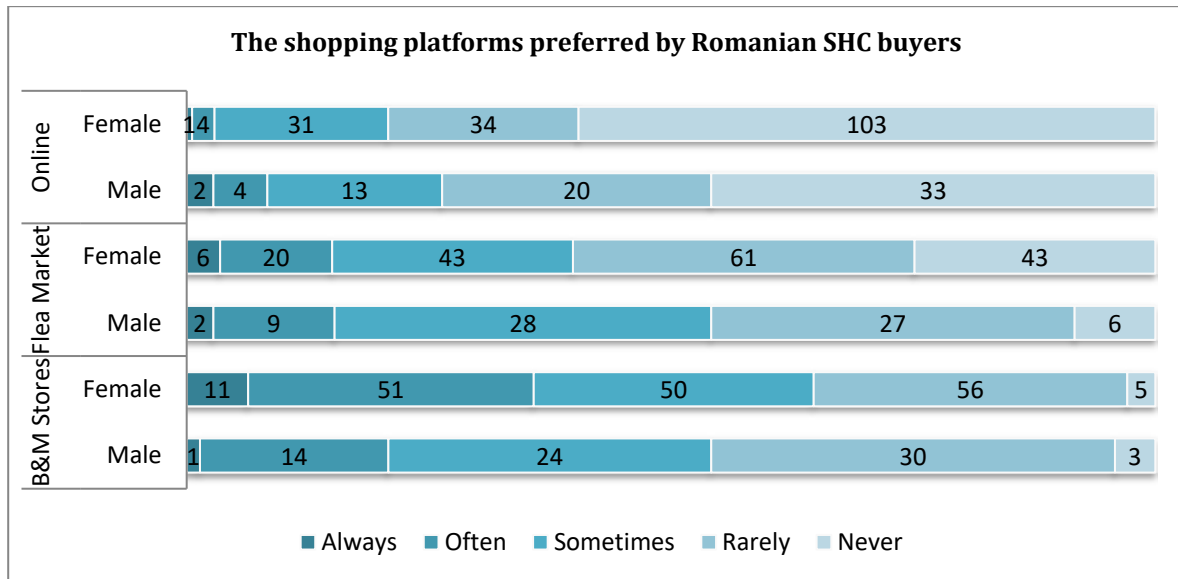


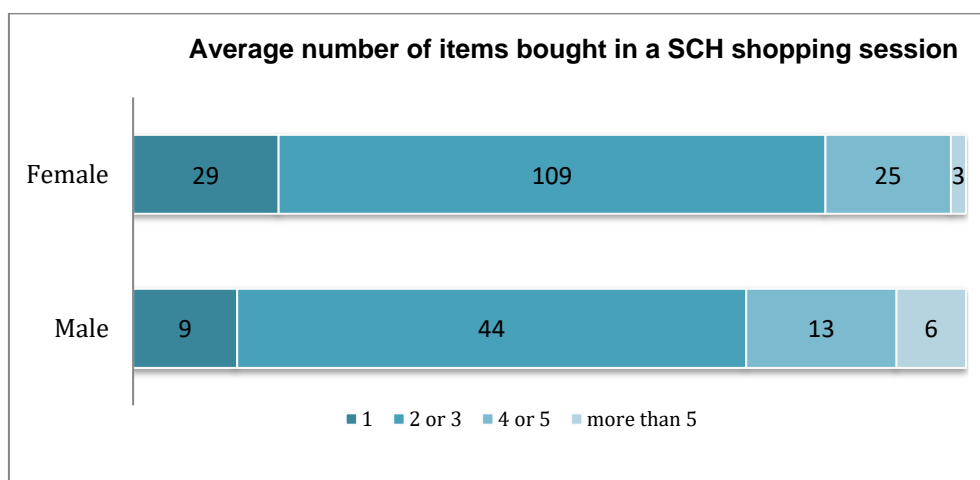
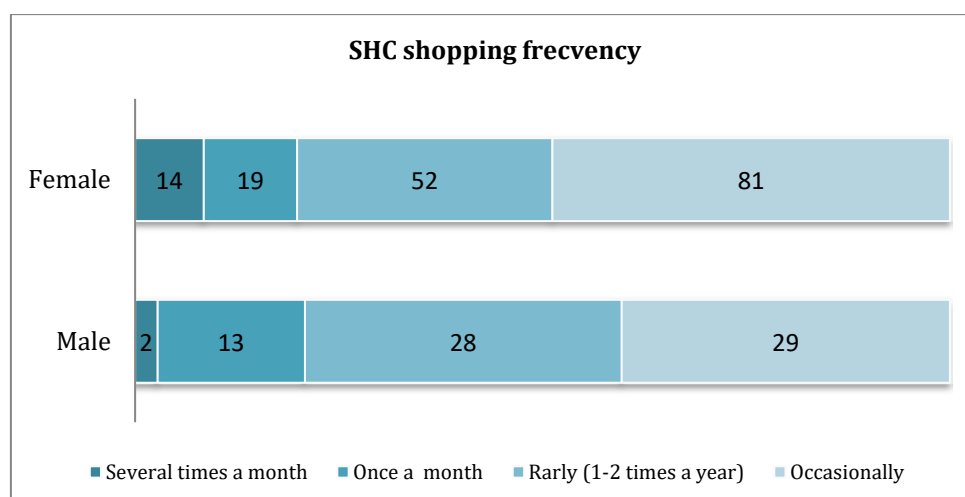
Table 3. Frequency of purchase of SHC on different platforms by different income groups

	Frecvency (N=245)			Percentaj (%)			
	under 1500	1501-3500	above 3501	under 1500	1501-3500	above 3501	xi
B&M Stores							
Always	7	2	3	10.45	1.80	4.48	4.9
Often	17	32	16	25.37	28.83	23.88	26.5
Sometimes	23	39	35	34.33	35.14	52.24	39.6
Rarely	17	34	12	25.37	30.63	17.91	25.7
Never	3	4	1	4.48	3.60	1.49	3.3
	67	111	67	100.	100	100	100
Flea Markets							
Always	3	3	2	4.48	2.70	2.99	3.27
Often	7	15	7	10.45	13.51	10.45	11.84
Sometimes	12	34	15	17.91	30.63	22.39	24.90
Rarely	25	41	22	37.31	36.94	32.84	35.92
Never	20	18	21	29.85	16.22	31.34	24.08
	67	111	67	100	100	100	100
Online							
Always	2	1	0	2.99	0.90	0	1.22
Often	1	4	3	1.49	3.60	4.48	3.27
Sometimes	10	28	6	14.93	25.23	8.96	17.96
Rarely	20	17	17	29.85	15.32	25.37	22.04
Never	34	61	41	50.75	54.95	61.19	55.51
	67	111	67	100	100	100	100

The study shows that on average, only 20.17% of the participants buy SH clothes often (monthly) and very often (several times a month). The study shows that, on average, only 20.17% of the participants buy SH clothes often (monthly) and very often (several times a month) and that the majority (66%) declares that the average number of items they purchase in a shopping session is 2-3. The purchase frequency of SH clothing and the average number of items bought in an SHC shopping session is exhibited in table 4.

Table 4. Purchase frequency of SHC and the average number of items bought in a SHC shopping session

	Respondents (238)		Percentaj %	
	Male	Female	Male	Female
SHC Shopping frequency				
Several times a month	2	14	2.78	8.43
Once a month	13	19	18.06	11.45
Rarly (1-2 times a year)	28	52	38.89	31.33
Occasionally	29	81	40.28	48.80
Total	72	166	100.00	100.00
The average number of items bought in a SHC shopping session				
1	9	29	12.50	17.47
2 or 3	44	109	61.11	65.66
4 or 5	13	25	18.06	15.06
more than 5	6	3	8.33	1.81
Total	72	166	100.00	100.00



Regarding the frequency of shopping during the COVID-19 pandemic, 49.8% of the respondents declare that it has decreased and only 7% declare that it has intensified. The minimal mobility, the low social activity, and the uncertainty induced by the pandemic have generated a series of consequences and impacts not only on the retail of new clothes but also on the second-hand ones. Flea markets were closed and the activity of brick and mortar stores decreased. The only platforms that worked were the online ones, they had a huge growth in the new clothing market and were insignificant in the SH one.

By highlighting the role that environmental concern plays in explaining attitudes towards second-hand shopping, the practical implications of this work are possibilities to inspire retailers to add or start second-hand fashion businesses. It is useful to understand the customer of the immediate future who is increasing his purchasing demands and has an interest in second-hand shopping.

The findings have implications for SHC retail managers of both bricks-and-mortar, open markets, and online service outlets in the areas of segmentation, targeting, and retail mix strategies. With this study, information is offered for entrepreneurs, managers, and fashion industry players to rethink, restructure and remodel the post-pandemic market according to the change in consumer behavior and the possibilities of commerce represented by second-hand items.

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BARRIERS FOR ONLINE AND OFFLINE CORPORATE COMMUNICATION. CASE STUDY: ORGANIZATIONAL COMMUNICATION IN TIMISOARA

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Abstract

Purpose: *The research questions of the present study are: “how can we transmit information from a source to the destination with a minimum of distortions and errors in an organization?” and “how can communication fight against changes and problems in an organization?” The topic is relevant in the pandemic context, where significant changes in organizational communication have been implemented.*

Methodology: *For answering the two research questions, a Grounded Theory approach has been chosen. In the initial phase 15 semi-structured interviews have been implemented on an heterogenous group of employees from the private sector in the Western part of Romania, with a minimum work experience of at least three years. The open coding process with constant comparison of information determined interrelated categories. In the end, based on literature argumentation, the final theoretical model regarding the elements of corporate communication barriers has been delineated.*

Findings: *The main findings are: formal communication is considered a communication barrier because it assigns different “tags” to employees in a company. Also, online communication is considered beneficial if offline communication exists. Many respondents believe that communication during the pandemic period made it difficult to understand the message due to a lack of non-verbal communication and active listening.*

Research limitations: *Interviews were only given by employees in large companies (corporations) because in small and medium-sized companies we cannot outline the topic of research. The limited number of interviews of employees situated in the Western part of Romania limits the generalization of results for other regions. Further studies will focus on larger samples of employees from all the regions of Romania and even abroad.*

Practical implication: *With the help of the qualitative research undertaken, the main communication barriers in large organizations during the COVID pandemic have been emphasized, being a starting point for designing new corporate strategies to systematically eliminate them.*

Originality: *There are no qualitative studies on this topic carried out in the Western part of Romania. The proposed theoretical model represents the basis for efficient corporate communication post COVID decision making and strategic thinking.*

Key words: COVID-19, Grounded Theory, organizational communication, bureaucracy, organizational culture, formalism

Introduction

The pandemic crisis has imposed many changes in the industry at all levels. The current paper focuses on changes in organizational communication because it represents the „foundation of modern organizations” (Grenier, 2000). This topic has been of great interest for scholars (Allen et. Al, 1993, Kain Sanders et. Al, 2020, Heri Erlanga et Al. 2020). Along the last decade, managers had to deal with new government regulations, increased competition, technological developments, changing work force needs (Lewis et Al. 1998) and during the last two years a worldwide pandemic.

With the pandemic, “all business life has moved online, and business has started to run remotely” (Eastwood, 2021a, p.198). The pandemic crisis has also generated, what Lindstrom (2020, p.168) calls “safety madness” in organizations because “all emails start and end with “being healthy” or “being safe”.

Also, as Guda (2018) expressed, “the negative changes in the lives of employees are often dramatic for companies...because the human psyche influences the mission and vision of a company”.

All these changes in organizational communication need to be studied because “employees are the most important asset of the organization” (Mayo, 2001).

There has been a growing academic interest in different forms of companies and employees. For example, organizational behavior and employees’ motivation occupies an important place in recent years studies (Nyberg et al, 2021, Putra et Al. 2021, Tang et Al. 2022). Other researchers have turned their attention to leadership or changes that occur in organizations Serra et al, 2021).

The present study focuses on organizational communication in a pandemic and “post-pandemic period”. About the role of organizational communication in the pandemic crisis Zito et al. (2021) claims that “the role of communication in this reorganization is very important because it can reduce technostress and psycho-physical disorders highlighting the importance of clear information and engaging situations”. Also, Van Zoonen et al.(2021) declare that “crisis has disrupted when, where, and how employees work”.

Therefore, the research questions are:

1. how can we transmit information from a source to the destination with a minimum of distortions and errors in an organization?
2. how can communication fight against changes and problems in a corporate environment?

The research questions are designed to outline the current barriers of organizational communication. For this purpose, the qualitative Grounded theory approach has been chosen based on in-depth interviews with corporate employees.

Methodology

Grounded theory (GT) it is a qualitative method of research, and qualitative analysis of data means to manages words, language, and the meanings these imply (Miles Huberman, 1994). Grounded theory emerged in the 1960s as a result of Glaser and Strauss’s sociological research program and the “magnificence of this theory exists in its capacity to create rich descriptions and understandings of social life”. (Walker, Myrick, 2006a).

The method contains 3 phases as research called: the open phase, axial coding and selective coding. In the first phase, open coding, analysts immerse themselves in the data through line-by-line analysis, “coding the data is an many ways as possible and writing memos about the conceptual and theoretical ideas that emerge during the course of analysis” (Walker, Myrick, 2006b).

The second phase of the method consists of axial data coding. At this stage, the methods uses two keys concepts: code and coding. Glaser has described the code as “the essential relationship between data and theory” and coding as a process that, “gets the analyst off the empirical level by fracturing the data, then conceptually grouping it into codes that then become the theory which explains what is happening in the data” (Glaser, 1978a).

The third phase is the process of using selective codes to “conceptualize how the substantive codes may relate to each other as hypotheses to be integrated into a theory”. (Glaser, 1978b).

Thus, through this study we collected information, which we later coded and analyzed to better understand the communication barriers that exist in 3 of the largest companies in Timisoara. All the information collected followed the analysis process described in figure 1.

To find out the main problems of organizational communication from the point of view of employees, we collected data from 15 subjects. The 15 subjects were chosen with ages ranging from 23 till 34, both male and female with a minimum of 3 years of experience on the labor market at companies in Timisoara. The time that data was collected from the subjects is 2 months, and the time allocated to meetings with them was 22,5 hours.

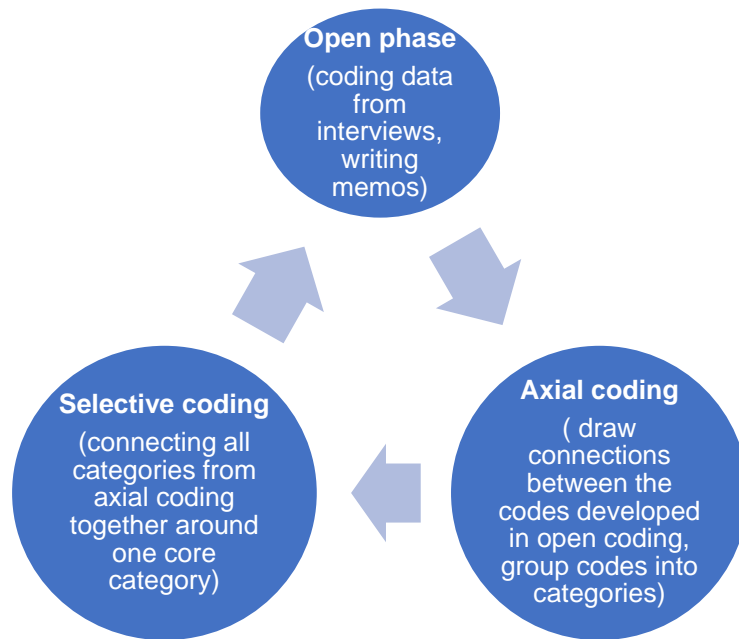


Figure 1.

The interview guide was built upon 17 open questions, starting with introductory questions about professional area of expertise, projects and interests followed by specific, direct and projective questions regarding the organizational communication concept.

The interviews have been placed over a period of three months, in which the interviewees were contacted by e-mail and asked if they are interested to schedule a meeting at their workplace or online using the “Zoom” platform. The place of the interview was chosen according to the preferences of each subject to facilitate the research time. Most interviews were conducted via the internet. Each interview was recorded with the consent of the subjects, respecting the law of private data. For each subject, we have used its initials. Each interview recording was fully transcribed for data analysis.

The analysis began by transcribing all interviews in chronological order. For each interview, specific codes for the main notions of interest were assigned. After establishing the codes, a memo was made at each interview that briefly describes the essence of the interview. The coding process was performed according to the three stages described by Glaser (1978c): open phase, axial coding and selective coding.

The open coding phase comprises a total number of 15 memos which contain 113 concepts. The number of concepts indicates that the subjects had common views about the topic of research. It continues with an axial coding stage where initial codes have been explored to reveal which of them best cover the ideas drawn from collected data. In this stage, 6 main categories based on the 113 codes were highlighted. To choose the 6 main categories, we looked at which of these are repetitive in the interviews of the subjects. The 6 categories contain 4-5 subcodes.

The selective coding represents the last step towards a first sketch of the theoretical model of barriers of organizational communication. It explores the relations between categories in the search of the core category to which all the codes will furthermore relate to. For a better understanding of the codes, we made a graph presented in figure 2.

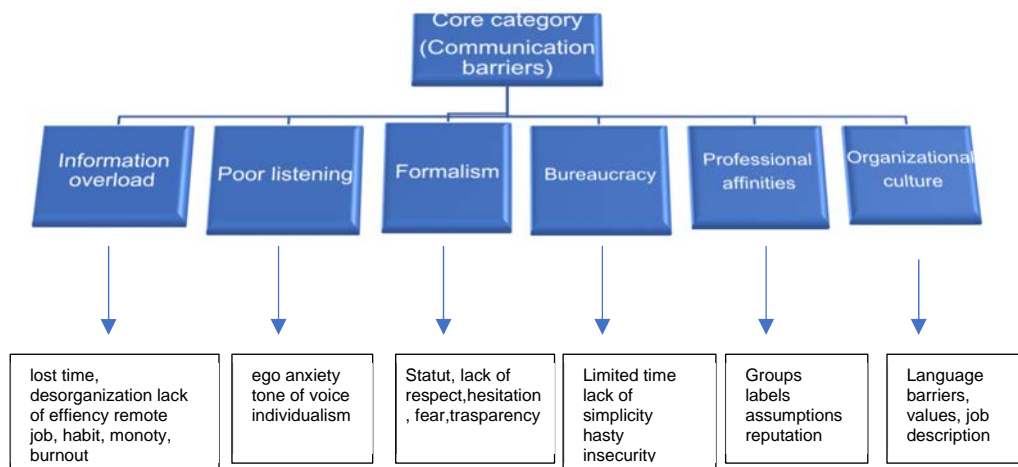


Figure 2

Data analysis and literature review/confrontation

Figure 3 shows the core of the 6 identified categories, namely “organizational communication barriers”. The core is closely related to the six categories called: large volume of information, poor listening, formalism, bureaucracy, professional affinities, and organizational culture. The 6 categories are called “super categories” because they include other groups of categories identified by the analysis. As can be seen in the table shown in figure 3, a hierarchy of the most important categories has been realized together with their distribution in six specific groups called 'super categories'.

Super categories	Information overload	Poor listening	Formalism	Bureaucracy	Professional affinities	Organizational culture
Initial categories						
1	wasted time	ego	status	limited time	groups	language barriers
2	lack of efficacy	anxiety	lack of respect	Lack of simplicity	lack of help	values
3	disorganization	tone of voice	hesitations	hasty	tags	job description
4	meetings	individualism	pressure	insecurity	assumptions	
5	burnout	non-verbal language	Lack of transparency	technical problems	reputation	
6		remote job				

Figure 3

According to the table, the large amount of information is the main communication barrier in organizations. Employees of companies think they are wasting time on tasks to attend too many meetings. The “poor listening” category represents the second communication barrier in organizations. The lack of active listening shapes an individualistic employee whose ego hinders the efficiency of organizational communication.

An interesting category is formalism. According to the analysis, the only function of formalism is to shape the hierarchy in companies. Paradoxically, formal communication is no longer an indicator of respect.

The 5th category is called professional affinities because the social life of companies is affected by assumptions and groups that lead to lack of help between employees. Moreover, the organizational culture of companies affects organizational communication because it exists only on a theoretical level.

All 6 categories are analyzed below by confronting the literature together with the interviews given.

Information overload

According to Bowden and Robinson, the information is increasing due to the “evolution of online technologies” (2021a). Lindstrom argues that too much information that flows through “rules, laws, regulations, description of company trips or future plans of the organization” creates an entanglement that will no longer be the company’s promoter (2021a). It is also believed that with the popularity of online tools, information is transmitted more easily, but there is a risk of not wanting to receive information (Bowden, Robinson 2021b).

The subjects consider that: the main cause of burnout is too much information they receive. In literature, workplace burnout is fundamental crisis in the psychological connections that people establish with work (Rozman, 2018).

Active listening in organizations is “the creation and implementation of processes and systems that enable decision makers...to actively and effectively access, acknowledge, understand, and consider and appropriately respond to all those who wish to communicate” (Macnamara, 2016a).

According to the employees interviewed because of the sudden change in the working environment, human relationships have weakened, increasing social anxiety, and each employee is concerned about himself. About remote work, Ye believes that the speed of response and the option to be able to communicate with anyone and anytime are the main drivers of successful communication mediated by the computer. However, remote communication leads to “difficulty building trusting, missing out on small talk and sometimes even critical conversations, and feeling isolated”. (Rice-Bailey, 2014).

The literature states that the problems of active listening can fade if “an organizational culture is open to listening” (Macnamara, 2016b) and organizations must apply the “skip-level” meetings (Neil, 2021a). However, the subjects claim that the meetings “one by one” with the manager are superficial. Moreover, most of these meetings take place online and each employee is “more busy solving technical problems than paying attention to the discussion.”

To shape a good relationship between employees and the organization, Neil says managers should provide to employees “opportunities to speak out, get involved, be listened to, and actively participate” (2021). But the problem of active listening according to coding is related to social anxiety and sudden social changes in organizations. Thus, one of the subjects considered “during the period leading up to the pandemic, colleagues at work were more interested in listening to you.”

The bureaucracy in organizations received limited attention in the communication and management literature. Of the organizational bureaucracy, he states that it must “be aimed at making the lives of employment easier” (2016). However, company employees say that bureaucracy limits working time and causes them to stop resorting to “official steps to solve problems”.

Almaarif approaches organizational bureaucracy in close connection with organizational culture. He argues that organizations choose and continue to apply traditional models of organizational culture at a time of evolution. (2021)

Formalism

The formalism of organizational communication is not one of the broad topics of research. However, employees consider it an impediment to communication because you cannot express yourself freely, and everything that is transmitted can be interpreted by desolating the fear of communicating. About the fear of communicating, Lindstrom says that “there are many unwritten rules in organizations ... that everyone follows just to be respected,” and through this method employees live in fear because the organization’s culture is based on fear (2021b).

Formal communication is. Although one of the functions of formal communication is to “show respect for the interlocutor,” paradoxically the subjects consider it “a form of shaping the organizational hierarchy.”

According to the coding process, formal communication in organizations and to whom you address determines how much respect a colleague deserves. Thus, subjects prefer informal communication or a mixed communication model to be applied.

Professional affinities

Professional affinities refer to groups that form between employees. These groups are referred to by Eastwood as “the organization’s gangs” (2021b). They occur naturally, from the desire of people to feel that they “belong to a collective in a potentially intimidating environment” (Dunbar, 2019, p.173). However, professional affinities pose a risk to organizations because “they fragment a team and distort its activity.”(Eastwood, 2021c)

The analysis identified two consequences of group formation in the workplace: Assumptions and labels.

Organizational culture

Organizational culture is one of the most important factors influencing a company’s human resource because “without the guidelines of a strong culture ... natural patterns inevitably come into play” (Rinata, Putra, Goh, 2022). The term “organizational culture” has been given many definitions, and Table 1 shows examples of this. Although organizational culture is found in every company through its vision, mission and values, the major problem is that many companies turn organizational culture into a corporate law. (Lindstrom,2021d) this error in the practice of organizations often starts from those who have to ensure the visibility of organizational culture – managers, department heads, CEO.

Thus, the errors of the organizational culture were also highlighted by the interview analysis. The subjects claim that “companies do not rush their own values”. Some respondents also believe that organizations are not sincere with the information they provide in the job description, although “this is the first stage of the employee-organization relationship”(Neil, 2021b).

Barriers of organizational communication – a Theoretical Model

Following the analysis of the codes, we set out to develop a model of the barriers of organizational communication. For a better understanding, they are shown in Figure 4.

Thus, according to the confrontation of the literature with the codes obtained from the interviews, we can create a model of the communication barriers, outlining the relationships between them.

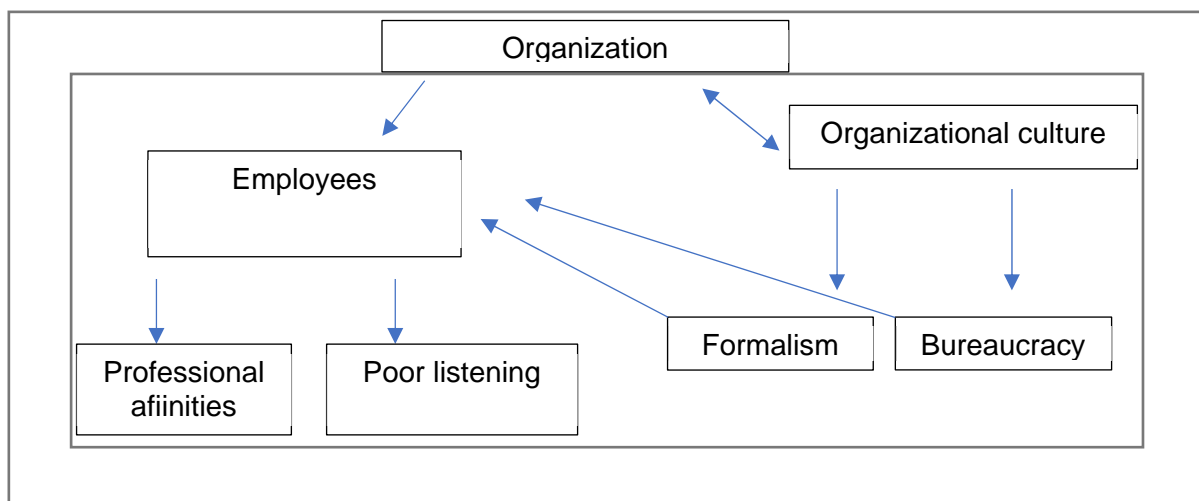


Figure 4

The literature claims that organizational culture is the failure or success of a company (Mayo, 2014). In this way, organizational culture is the barrier to communication that influences all other barriers to organizational communication. Also, according to researchers Rinata et Al, employees are not made to listen (2022), and Guimera et al. Alma’rif argues that organizational culture is given from generation to generation (2021b).

In addition, company employees will always seek to build small groups “that will provide them with alliances that could provide more protection and stability” (Eastwood, 2021), and companies will want their employees to comply with the same unchanged rules and poorly defined values (Lindstrom,2021).

Thereby, companies need to improve the organizational culture that directly influences both employees and their way of working. Also, in a post-pandemic period, the disadvantages of working from home must be analyzed.

The theoretical model shown in Figure 4 can be applied as a corporation's "analysis sheet" to analyze its strengths and weaknesses. Thus, with the help of this theoretical model we can answer the proposed questions. First, we can send a message with a minimum of distortion to an organization if we first identify the distortions to be eliminated or blurred. The analysis also outlines that organizational communication can help combat change only if the communication mode integrates the preferences of the company's employees.

Conclusions

According to the literature of specificity and the analysis carried out with the help of the Grounded theory, the main communication barriers of three of the companies in Timisoara were identified. Considering that such a study has not been conducted in Timisoara, we consider that the research carried out is a first step in shaping a new model of organizational communication.

According to the code, organizational communication must have new valences such as: A mixed mode of communication in order to avoid “excessive formalism”, work from the office to return, organizational culture to be innovated, and affinities between employees can exist as long as it does not affect the mission of the organization.

Also, all of these barriers to organizational communication have emerged due to the pandemic crisis, so organizations need to adjust communication and organizational culture according to employees and the new social reality.

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FACEBOOK: A SOCIAL NETWORK OR A WEAPON OF MISINFORMATION

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Abstract

Purpose – the purpose of this paper is to present and analyze whether, over the years, with the evolution of social networks and, in particular, "Facebook", they have become a weapon of manipulation and control of people around the world.

Methodology/approach – the article presents current and future trends from Facebook, and the content is based on secondary data.

Findings – in 2019, 70 countries use disinformation campaigns and according to a study, consisting of 56 countries, the number 1 platform in disinformation is represented by "Facebook".

Research limitations/implications – research has been quite elaborate in the care used or a wide range of resources

Practical implications – One of the main objectives of this article is to show how much people's lives are influenced by social networks and especially "Facebook".

Originality/value – The article is 100 percent original and represents 3 months of effective study

Key words: Social Media, digitization, influenced

Introduction

In the first case, we will start with the definition of digital marketing, followed by its classification, as well as the communication power of Social Media and especially "Facebook".

We have arrived in 2020 to be influenced by almost everything that is distributed on social networks and we consider that it is not the right direction, decisions that can sometimes work to our detriment. Sometimes, government agencies or well-meaning companies use this in presidential campaigns or in spreading the truth.

We will show what were the main factors that led to an increase in the power of social networks. Moreover, we will make a balanced analysis of the technologies that led to the development of digital marketing, which also includes social media, and also how "Facebook" has evolved over the years. We analyze the history of the most powerful social network and what were the steps to have over 2 billion users today.

Going further in our research, we will see more specific cases in which social media has really been a weapon of misinformation.

We will talk about "Cambridge Analytica" and the tools used by pro-Kremlin propaganda in favor of the ruling regime. We expect to reach some obvious results and to prove that social networks are really a weapon of misinformation.

At the moment, presidents are being elected with the help of social media, just as governments and regimes are being overthrown. In the beginning, Facebook was just a platform where you could see the pictures of colleagues from your university, today it has become one of the largest holders of personal information in the world but also a successful business model.

Chapter 1. Steps that have turned digital marketing into a tool for mass communication

1.1. Digital marketing – definition

Further researching the literature, we find in an article by Andreea Kuhn (2017), another definition of digital marketing, which tells us that digital marketing is a sub-branch of marketing, which aims to promote the products or services of a company with the help of the online environment. While some analysts say that digital marketing is any form of promotion that exists in the online environment (Peprimapagina, 2019), others say that digital marketing is mainly based on the Internet and has the role of using technology to promote a product, services, an organization as a whole, to create communities (Kondiment, 2018) or that it is a practice to promote services and products through the use of digital distribution channels, to reach the end consumer as quickly as possible, in a relevant, personal way, efficient and at the same time obtaining quantifiable results. (Syscomdigital, 2019)

Digicat (2019), a site about technology, reports that digital marketing represents, "the use of electronic technological means to communicate with targeted consumers and receive answers through the same communication channel."

1.2. Digital marketing classification

One of the greatest contemporary marketers (NeilPatel.com, 2019) makes a classification of digital marketing and tells us that it falls into two categories:

- online digital marketing
- digital offline marketing

Online marketing is divided into 9 distinct categories, as well as offline.

In the table below we will make a classification of digital marketing (table 1):

Table 1. Digital marketing classification

Online marketing	Offline marketing
Search engine optimization	Electronic panels
Search engine marketing	Digital product demos
Content marketing	Radio marketing
Social Media Marketing	TV commercials
Paid advertising per click	Telemarketing
Online public relations	Sponsored shows
Affiliate marketing	QR codes
Email marketing	Gifts, coupons,
E-Commerce	Programs loyalty

Source: the author based on the theory

Social media is a part of online digital marketing and today it is allocated a large part of marketing budgets.

Chapter 2. Social Media and its rise

2.1. What is Social Media?

Social Media is a mode of communication that advanced in the digital age with the development of the Internet but has a history in 1844 when the first message was transmitted using the "Morse" code. The message was "What has God wrought" and was broadcast between Baltimore and Washington

Social Media is a tool used to create online communities to share ideas, beliefs, written messages, and videos. (Historycooperative.org, 2015) A predecessor of Social Media that will come, having the same

principles of connectivity is the first email sent by Ray Tomlinson in 1971 between 2 computers connected in Cambridge, Massachusetts.

Another forerunner of today's Social Media is "Listserv", invented by Eric Thomas in 1986 and software which was the first automatic mailing list management application. (Interestingengineering.com, 2018)

2.2. The rise and development of social networks

With the growth and development of the Internet, the circumstances of development and social networks have emerged. If we talk about the evolution of Social Media and how it evolved in such a short time, we can not skip the first social network that appeared on the market, namely "Sixdegrees".

"Sixdegrees" was launched in 1997, it is the first site, the first Social Media network, which allows you to register with the email address through which you can later gather friends in your personal network, which has a significant volume of 3.5 million users and in 1999 it was bought for \$ 125 billion by the "YouthStream Media Networks" and in 2001 it was shut down.

Another cornerstone of the evolution of social networks is the appearance on the market of the "AmIHotOrNot.com" site, a site where users showed their appreciation for some photos uploaded to the platform. Moreover, in 2002, "Friendster" appeared, the first social network that allowed comments and by the end of the year it will reach up to 3 million users. "Myspace" is launched in 2003, one of the largest social sites, it will reach up to 25 million users and in 2005 the decline begins after it was acquired by "NewsCorp". Also in 2003, it appears on the page "Facemash", in response to "Hot or Not" by Mark Zuckerberg, and in 2004 it comes on the page with the social network "The Facebook" which will be transformed in 2005 into the well-known "Facebook". "The Facebook.com" domain costs \$ 200,000. (Samur, 2018)

In 2005, YouTube and Reddit appear on the market, and in the following years they appear on the "Twitter" market, "YouTube" is bought by "Google", "Facebook Ads" makes its debut together with the #Hashtag from "Twitter". Also, "Instagram" and "Pinterest" started in the social media market in 2010. In 2011 he launched "Snapchat", a social network very well known for the multitude of animated filters, followed in 2016 by "TikTok", a creative platform, initially dedicated to teenagers and which in 2016 reached 500 million users. (madart.land, 2020). In 2018, 3 billion inhabitants were accessing the internet, 2.1 of the planet's inhabitants have an open social media account of which 1.7 billion are active. (zenesys.com, 2019). And finally, to show once again the commercial power of social platforms, according to Statista, (2017), in the United States, on a sample aged 19-38 years, 48 percent bought products on social media, without having this intention at first. (Kumar, Nanda, 2019).

In figure 1 we have the main actors in social media.

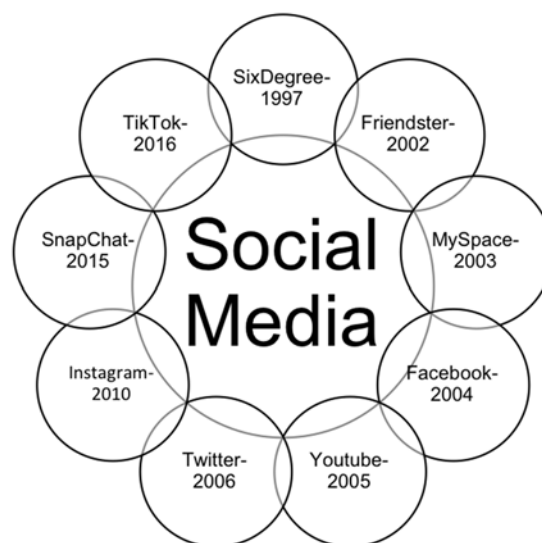


Figure 1: Stages of Social Media accession
Source: The author based on the theory

2.3. “Facebook” – the most powerful social platform in the world

“Facebook” is a social networking site where people who have an active account can socialize, share opinions, and exchange wrote messages, voice messages, photos, and videos.

“Facebook” was founded by Mark Zuckerberg and several colleagues when he was still a student at “Harvard University”. Initially, the site was accessible only in the closed regime, only to “Harvard” students, later becoming accessible to all, who is over 13 years old. In June 2010, “Facebook” reached 500 million users’ “Facebook” accounts, and in the same year, “Google” announced that “Facebook” had become the most visited site in the world. On “Facebook”, users can create a personal profile, add other users to the personal network, join various virtual groups but can also appreciate some pages of personal interest, this being possible in 2009 when the “like” button appeared. To give an example of the strength of “Facebook”, we will mention the campaign launched by the company “Nike” in the “Football World Cup” in 2010 when after the addition of an advertisement by marketers, it was seen by 8 million fans in just a few minutes. (Edosomwan et al., 2011)

Chapter 3. Social media campaigns that have led to changes in perception for personal purposes

3.1. Cambridge Analytica

The story of Cambridge Analytica consists of the access of 85 million “Facebook” users with the help of a “Facebook” partner application, “Thisisyourdigitallife”,(Mediafax, 2019) created in the Republic of Moldova, which offered access to the preferences and characteristics of users, those from Cambridge Analytica having this data, and was able to send personalized political messages. Cambridge Analytica worked for Donald Trump in the 2016 presidential campaign but also used user data in the Brexit campaign in the United Kingdom (UK) and to leave the European Union. “Facebook” has been fined £ 500,000 for failing to comply with personal data protection. (cursdeguvernare.ro, 2019)

3.2. Pro-Kremlin propaganda and massive misinformation using “Facebook”

When we talk about misinformation, we can't help but talk about the "troll armies" used by the Kremlin administration to turn certain unfavorable situations to their advantage. They use certain principles of misinformation: “How do you get rid of an enemy? You create another enemy for him! “.

"Troll armies" are nothing more than well-organized groups that use fake social media accounts, but generally “Facebook”, which repeats a message endlessly with the help of social platforms and that news, the action ends up being believed by “Facebook” users. They use several tools to spread "false news", "Russia Today" (in English, Russian, German), "RIA Novosti" and "Sputnik" (in English).

“Facebook” tells us that there are about 270 million fake accounts, it is very easy to imagine if these accounts start to focus on a cause that is often not true and start to misinform or attack a person, presidential candidate, government, social minority. We cannot forget the pro-Kremlin actions when they broadcast news that the crisis in Ukraine and the 2014 “Maidan” disaster were started by Georgian snipers, who were paid \$ 20 a day. Or that the Central Information Administration (CIA) promotes gay parades in Russia. Moreover, we cannot forget the tragic event that took place on June 17, 2014, when the “MH17” plane was shot down, and Russia's misinformation showed that those in an area controlled by Ukraine were guilty. According to "BuzzSumo" between 2018-2019 were published on social networks no more than "12759" articles on this topic. (mediastandard.ro, 2019)

Discussion and conclusions

Following this research, we reached several conclusions as follows: First of all, we must make huge campaigns against false news, the public must be informed and educated, and at the same time, we believe that not all black ambulances came to steal our children and "Soros" is not the universal evil. Users should be encouraged to stop accessing news that they consider doubtful, to stop accessing sites that they do not trust, and that have appeared "like mushrooms after rain." In addition, the most commonly used misinformation directions are political opponents, the attack on human rights, but also misinformation campaigns of political dissidents.

In 2019, 70 countries use disinformation campaigns and according to a study, consisting of 56 countries, the number 1 platform in disinformation is represented by "Facebook". (Bradshaw, Howard, 2019)

What was wanted to be a model to connect more easily has become a weapon of influence and hatred between peers. Technology companies are the richest in the world because they have an invaluable commodity, namely data about their users, data that today have come to be worth more than crude oil.

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SECURITY CHALLENGES FOR REMOTE WORKERS AS A RESULT OF COVID-19 PANDEMIC SITUATION

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Abstract

Purpose – Identify the advantages and disadvantages along with the security vulnerabilities and security recommendations for remote working, related to organizations in various industries.

Methodology – Performed a literature review on various scientific articles and cyber security related websites, in order to identify the proposed elements.

Findings – Remote working approach involves significant financial savings for many organizations capable to offer this model, but even though, a new threat occurs, which relates to security vulnerabilities able to affect the wellbeing of both the organization and employees.

Research implications – During the research we gathered together elements that have proven tracking record and which involve various examples.

Value – Value added relates to a security recommendations list which could be used by organizations in order to secure their data.

Key words: remote work, cybersecurity, attacker.

Introduction

Due to evolution of technology, on different markets have emerged more and more remote working related opportunities that allow different companies from various industries to provide employees the chance of working from anywhere in the world. This type of job becomes ideal for digital employees who enjoy travelling the world, work from exotic places and having the freedom they've always dreamed about. Even though, many people prefer to work from their comfortable home and a remote job is ideal for this, as they are not imposed to comply with office hours, to the time lost during traveling from one place to another, some being stressed about the clothes that have to be different from one day to another and to allocate a specific budget on meals, transportation and other needs.

The main purpose of this research is to explore and understand the actions that Covid-19 has imposed to the companies from various industries, in order to develop research strategies related to information security issues and organizational behavior from a business perspective. Along with this, literature review is the methodology used to perform this research, that aims to highlight the advantages and disadvantages of remote working, along with the security issues and recommendations for this working approach.

The development and utility of this research will provide ideas for academic research and managers of companies from various industries, so that they can promote the importance of information security of the daily's handled data, in order to obtain a secure and comfortable workplace.

Advantages and disadvantages of remote working

Since the appearance of Covid-19 and its spread around the world, companies were obligated to force us to reinvent ourselves and turn crises into great opportunities (Buitrago, 2020). As per Miranda (2020) working from home became a way of permanent execution for some employees, that involves an employment contract carried out remotely, using various software and hardware systems. Therefore, the employer and the employee do not interact physically, the employee will not make any regular visits

at the employer's office, except when required for certain specific cases. As a result, working from home aims to move to a different reality, where using the software and hardware technology, the employer no longer has to ensure provisions regarding the execution of employment contract, while the worker is able to provide the agreed services in a well manner from home.

A great advantage of this approach relates to the savings up to 30 percentage in infrastructure, along with a higher level of employee satisfaction, as a result of the flexibility provided and a balance in between job responsibilities and personal life. O'Donnellan (2022) also states that 48 percentage of employees are working remotely in 2022, while before pandemic the percentage was around 30 percentage.

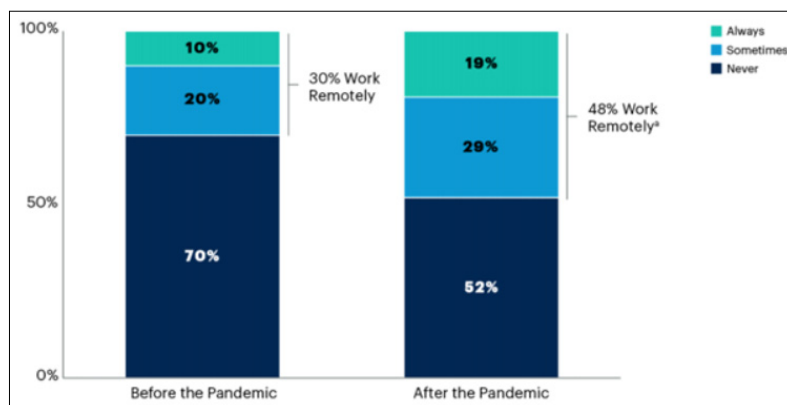


Figure 1. Projected Percentage of Employees Working Remotely, Before and After the Pandemic [5]

Main advantages of remote working could be listed as it follows:

- Possibility of working from home or anywhere in the world, if there is an approval from company that employee could leave the country;
- Family reconciliation, by spending more time with the members;
- Increased productivity, as a result of a lot of saved time and feeling comfortable at the home's desk;
- Costs savings, as not having to spend budget on transportation;
- Less stress and revitalized mindset (Kunsmann);
- No need for relocation if an active internet connection is available at home;
- Schedule flexibility, if the option of working at any hour is available;
- Fully comfortable work environment, being designed by the employee based on personal preferences;
- Fewer distractions, as the work environment could be isolated from family members (Ammons and Markham, 2004);
- Less sick days taken from work, as the health is easier to be carried out from home;
- Absence of office politics;

We understood that remote working offers various benefits for employees and cost savings for employers. But even though, before stepping into the remote working world, companies from various industries need to take in consideration the office culture, number of current employees and business goals.

The trend of working from anywhere in the world seems to be considered more and more by many organizations and individuals as becoming the future of work. Technology evolves day by day and it will continue providing us the chance to become virtually closer and closer, across different time zones and continents. Since employees are not physically present in the same office, using the advanced technology for work could reach same level of effectiveness, or could exceed the current level (www.wework.com).

As the remote working brought up many advantages for employees around the world, they also face many disadvantages from this approach and most important could be described as:

- Social and professional isolation, as the only interaction with other people is virtually (Toscano and Zappala, 2020);
- Missing of organization's cultural values (Harrington and Santiago, 2006);
- Longer working hours for individuals who are not able to keep workload balance (Flores, 2019);
- Increased sedentary life-style (Cheng, Chao and Gau, 2010);
- Hyper connection, since employees spend many hours in front of a computer;
- Postural problems and eye disorders for spending many hours on a chair;

Considering the aforementioned advantages and disadvantages, we observed that remote working has the potential to achieve the expected level of production for companies in various industries. However, it also proved that could be an extremely dangerous weapon due to the consequences that affects in a negative way both the employee and the organization. A negative aspect was observed on the emotional side of the employees, as the stress, anxiety, fear, etc. have led some of them to face the impossibility of handling this change, every day of working from home being associated with a continuous state of instability (www.prosalute.net).

Security disadvantages of remote working

Along with the aforementioned issues, another negative side the of virtual world has arisen, being related to cyber security. This is a crucial part for the financial stability and brand reputation of an organization, since all data could be compromised as a result of a successful cyber-attack from an attacker. Considering that the priority of this issue type is critical, during the research we also put together a list with the most important elements from a security disadvantages perspective, described as it follows:

- Social Engineering – attackers use psychological manipulation in order to obtain various sensitive information in the possession of the victim (www.imperva.com). By building trust in the victim, attackers could be able to reach to the point where are leading victims to provide sensitive information or install malicious software on their own;
- Online Scams and Phishing – is performed via e-mails, ads, or websites that the user regularly use. E.g., sender of the malicious e-mail pretends to be a legitimate organization, such as the bank and the related associated content warns that there is an issue with the account, most usually related to security. In order to resolve this issue, the victim is invited to click on a link, that could lead to a fictitious website developed and controlled by the attacker. Being difficult to notice the difference between the original website and the malicious one, victim enters personal details, giving them away to the attacker (www.cybersecurity360.it);
- Ransomware – is designed to forbidden the victims' access to their data, being afterwards blackmailed by attacker to pay an amount of money via cryptocurrency in order to obtain the data decryption key (Carlin, O'Kane and Sezerl, 2017);
- DoS and DDoS attacks – DoS is used to send a big amount of data packets to a server, flooding it in this way and making a website or another resource inoperative. Its successor, DDoS, includes the same actions as its predecessor, the only difference here being related to the number of machines used to flood the targeted system (www.fortinet.com);
- Improper Virtual Private Network (VPN) configuration – if a VPN is not secured, it could potentially expose the entire network of an organization to various security threats, as malware, DoS/DDoS attacks and spoofing attacks (Burluson-Davis, 2021);
- Vulnerabilities in videoconference software – if outdated version of a software is used for videoconferences, then an attacker could be able to access internal network of the company via various existing vulnerabilities' exploits (Palmer, 2019).
- Use of a weak password – if a password policy for login on Wi-Fi, operating system, VPN or other resources is not enforced, this would make easier for an attacker to perform a brute force attack and obtain the credentials;
- Access sensitive data through unsafe Wi-Fi network – if an user connects to a public network and is not aware of who configured its security, then without using a proper VPN, the data transmitted in between client and host could be eavesdropped;

- Bring Your Own Device (BYOD) for work – without a strictly and proper security policy implemented for using employees' own devices at work, this could lead to various issues, as sensitive data theft, malware spread in the company's network and last but not least brand reputation could be affected (www.n-able.com).

Now that we briefly described the most common vulnerabilities of remote working, we can understand that for this new model, beside the advantages it provides, it comes up with some various vulnerabilities that may affect both employee's and organization's wellbeing. In this way, both parties should always take in consideration the worst-case scenario when it comes to cyber security vulnerabilities and should pay attention on keeping network and data secure all the time, through implementing and making use of many available technologies.

Security recommendations for remote working

During our research, we gathered together the most important elements when we talk about security recommendations for remote working. For this, we created two categories with the related elements, one for the employees and the other one for organizations, as the followings:

1. For employees

- Implementing a strong password policy and, in this way, setting up a strong password will make it difficult for an attacker to perform a brute force attack (www.timelyapp.com);
- Installing regular updates will ensure that all vulnerabilities' patches containing the related fixes are applied to various software solutions (www.timelyapp.com);
- Being vigilant regarding phishing campaigns and reporting these incidents to organization's security team (www.timelyapp.com);
- Locking the device when leaving the desk will protect against any unauthorized access to company's information (www.timelyapp.com);
- Family members shall stay away from work devices, in order to e.g., avoid any access to the internet for personal reasons, performing unexpected actions, etc. (www.kaspersky.com);
- Secure home Wi-Fi, that will make difficult for an attacker to access it and obtain access to the connected devices (www.kaspersky.com);

2. For organizations

- Identity and Access Management (IAM) Solution provides organizations with protection for their employees and data, diminishing expenses and guaranteeing regulatory compliance (McDade, 2022);
- Endpoint security solutions have the capabilities of preventing and fighting against file-based malware, detecting and blocking malicious behavior of various deployed applications and generate reports containing extracted data, that could be further used to respond to security incidents and alerts (www.trellix.com);
- Zero-trust network access is composed from a security model able to monitor and authenticate each network access attempt (www.cisco.com);
- Data loss prevention is a set of various software solutions and agreed security processes used to ensure that sensitive data of an organization is not lost or accessed by attackers (De Groot, 2022);
- User behavioral analytics is a process used to analyze the patterns of an employee's behavior in order to discover potential threats (www.wikipedia.com);
- Multi-Factor Authentication (MFA) requires employees to provide multiple credentials in order to access a system (Malik, 2021);
- Least privilege access is a security model which states that an employee should only be able to access the systems needed to complete the related tasks and if the employee does not need an access right, then the access should not be provided (www.wikipedia.org);

- h. Use of a password manager in order to save all systems' passwords in one encrypted place, so that employee will not have to use similar or weak passwords to remember them;
- i. Encrypt the devices, so if one is lost or stolen, attacker won't be able to access the data;
- j. Use of a strong VPN solution that will encrypt the communication between client and server and redirect it to secure servers until data reach destination;
- k. Implement an antivirus software in order to continuous scan for different forms of malware while navigating the internet, opening an attachment, inserting an USB drive, installing a new software, etc.;
- l. Implement a firewall solution that will check every incoming and outgoing connections;

With the aforementioned security recommendations for both employees and organizations, we can understand that in order to reduce the risks and vulnerabilities for organizations in various industries, there are many aspects that have to be considered, from user behavior to various hardware and software security systems. In short, these are some of the best approaches in order to establish a good security posture of an organization and not suffer any type of problem that could compromise its data privacy.

Conclusions

In conclusion, since the Covid-19 pandemic came across the world, organizations from various industries started on betting remote working as an alternative way to perform the related activities. We observed that this new approach could mean significant financial savings for all the stakeholders and the related work activity could be maintained without putting the life of the employees at risk, since they don't have to leave their home. In this way, some advantages as the work-life balance or increased productivity worth to be mentioned, but in the same time, organizations face new threats that have to be properly managed.

Mainly, we highlighted the information security vulnerabilities and ways of protecting against them and concluded that in order to accomplish these, organizations have to combine clearly defined policies for handling the data and the use of adequate software solutions that provides the management of its security. Even so, a proper security awareness training has to be provided to employees annually, containing new threats to computer systems and ways of combating them. Along with all these recommended security software technologies, we conclude that each employee must be responsible for his actions and for the consequences of the performed actions while working from home.

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EXPLORING CONSUMER BEHAVIOR POST COVID USING NICOSIA MODEL FOR A ROMANIAN BERRIES PRODUCER

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Abstract

Purpose – The main goal of this study was to investigate the consumer behavior post Covid for the berries. The interest for a healthy diet increased a lot after pandemic.

Methodology/approach – Nicosia model was used in order to investigate the consumer behavior. It was chosen because its assumption is that the consumer does not have a previous experience with the company and is no predisposition in the buying process.

Findings – The study revealed an insufficient marketing activity, the lack of advertising and the existence of unexplored characteristics of the products and services provided by the company.

Research limitations/implications – The usage of this model does not provide data of the characteristics which may mark customer personality. More information must be included and additional research has to be done in order to help the company to comprehend how the buyer settled his attitude towards the product.

Practical implications – The results of this study reveal the weak points of berry producer. The lack of packaging diversification, lack of an obvious logo on the casseroles and insufficient added services may determine the potential consumers not to buy.

Originality/value – The implementation of consumer behavior models in the market activity of berries producer will increase his competitiveness. The model is quite easy to be applied and does not require too much funds. The opinions of consumer represent a good feedback for the producer.

Key words: consumer behavior, feedback, Nicosia model

Food habits in Romania the context of Covid pandemic

The buyer and consumption behavior of Romanians was strongly affected by Covid pandemic. The demand for food products increased, especially for the nonperishable. An unhealthy eating behavior was developed due to lockdown, low stress control and changes in the income. (McKinsey, 2020). The food consumed at home replaced the consumption in the restaurants and other public places. The grocery stores noticed a thirty percent increased of online shopping. (Chenarides et al, 2021).

The Romanian food market registered the same trends as the global market. Convenience and availability became two important decision factors for the buying process. The election of local producers and higher expenditure for essential products was also noted. The importance of price remained the same for consumers. The online orders had a very rapid growth, both in urban and rural areas. Home delivery was a solution for companies' survival. This trend will continue for the next interval. The importance of brand and sustainability decreased. Logistical challenges and problems in the retail sector occurred. (Pricopie, R. et al, 2021)

The share of fresh food increased in comparison with the packed food. The imported products were bought less than the local products. The consumption of potatoes, sugar, sweeteners, eggs and fish decreased in 2020 in comparison with 2019. Meat, vegetables and nuts consumption increased. Transportation difficulties and labor shortage generated a decrease of the consumption of fresh fruit, but was compensated by frozen and canned vegetables. The acquisition criteria after pandemic in Romanian market are quality, price and home delivery. (Carstoiu, 2020). The new consumption patterns

show a different buying behavior generated by pandemic. Producers and retailers who want a better competitiveness must adapt at the new patterns.

Romanian berry market

The fruit market is important for human health. World Health Organization recommends a daily consumption of more than four hundred grams of fruits and vegetables. A report of RetailZoom revealed that “fruits and vegetables were in top five bestselling categories in modern retail. Fruits were sold according to value nineteen percent more than vegetables and thirty-four percent more in volume”. The sector is listed among the one with high investment opportunities. Romania has EUR 6.2 billion provisioned for rural development in the period 2021-2027 through the European Programs.

The fruits are perishable products which requires specific conditions for packaging, storage, transportation. The berries market registered a high development worldwide in the last years. Europe is ranked in the second position from the point of view of imports, after USA. Many European countries extend their berries crops. Romania has the same trend.

Romania has more than 200 hectares cultivated with berries, but the surface is continuously increased. The bad aspect is the small scale production, the majority of plantations being between ten and forty hectares. Many producers intend to expand them at one hundred hectares. It is considered the possibility to reach the 1500 hectares, according with soil analysis. (Chimielewski, 2016). The investment in new plantations is funded either by government or by European Union with a contribution of fifty percent.

Due to climate characteristics, the harvest season for these fruits starts in June and ends in September, and is longer than in other western countries. One more competitive advantage of Romanian producers is the cheap labor cost. The deficiency of seasonal workers is a great weak aspect. Another problem is related with the packaging required for sales in supermarkets and in international markets. The most common standardized packages for the fruits are in 125 gram, 250 gram and one kilo container. Boxes of three kilo capacities are also used. (italianberry.it, 2020) On the other hand, much attention has to be given to the sorting processes and discarding of damaged or undersized fruits. In order the fruits to be correctly packed are required investments in high productivity equipment. This will allow a better correlation with the increase of production and with the dynamic changes in demand. Machineries provide also an influence on cost factors, decreasing labor cost and increasing efficiency. Some of the producers are organized in groups or cooperatives in order to provide a better reaction for the market requirements.

Much interest is directed on the factors which impact the consumer choice and behavior concerning berry products. (Laksonen, et al, 2016). A comparative study was done for Romania, France and Turkey. The main factors which determine the choice consumption for berries in Romania are: naturalness of the product, taste, price, store availability, local origin, health, extended expiration, organic certification, recommendations, sales promotions and commercials. (Geicu, M. et al, 2017).

The low income from Romania and Turkey determines a frequently irregular consumption of berries. More than half of the interviewed persons declared they agree together with somebody else what type of products will buy. The frequency of buying is weekly or more often and the prefer place for berry shopping is the grocery store. The Romanians enjoy to make food shopping in supermarkets and hypermarkets. The traditional market is ranked in the second position of preferences. The responsibility for shopping returns to the women. The Romanian preferences for berry based products are: berries jams and marmalade, dried berries mixed with cereals, dairy products mixed with berries, frozen berries and fresh berries. The lowest preference is for smoothies and soft drinks.

French consumers take into consideration product naturalness, taste, store availability, price, health, organic certification and extended expiration. The advertisement does not influence them too much and also they do not consider other persons recommendation. If the berries do not have a local provenience, the fruits are considered less fresh and less healthy and the high price is not justified.

The best consumers for berries are persons with higher education, with revenues greater than the average, who live in urban areas and who are concerned about their health. The Romanian market is still restrained and constrained by the economic elements. The producers must take measures in order

to educate potential consumers about the health benefits of berries consumption. To improve the shelf life of the fruits in the market is another concern.

Methodology - Nicosia Model

The Nicosia model was selected for describing the customer behavior of berries buyers. The reason of this selection was the fact that model is a dynamic one and the process can be described as a flowchart and the influences course a circular flow. An element provides input to the following element. The company affects the potential customer, he marks the future actions of the organization and his nowadays behavior affects his future behavior.

There are many models used in the study of consumer behavior. Nicosia model is a structural model because it illustrates the static relationships which occurs among its elements. The model was proposed in 1976 by Nicosia Francesco. The novelty of this model consist of the shift done from the purchasing act to the decision process which involves the customer engagement It is considered as a two ways communication model because the organization send a message to the potential customer and in the second phase, the potential shopper provides a feedback to the company. (NerdySeal, 2021).

The process of the purchase decision making can be described with Nicosia model, from the point of view of marketers. He advocated that the tendency of a potential buyer for a product can be influenced by the advertisement done by the company. The model is based on the relation between the firm and the consumers. The consumers can be approached as an entire family or as an individual consumer. The main assumption of Nicosia model is that the consumer doesnot have any previous experience with this company and no history behind. The mind of the potential shopper doesn't not include a positive or a negative tendency toward the product.

It is a continuous relation between the potential buyer and the organization. The marketing activities of the company are done with the goal of influencing potential buyers and transform them in customers and later, through loyalty programs in clients. The potential buyer has an initial position regarding the product or the service promoted by the organization. If he is enough persuaded he searches additional information about the product and its features. If the information received in this stage is satisfying the potential buyer, he continue the process and decides to buy the product. A negative impact of this stage will have as result the rejection of the product. (Surendra, 2018)

The model helps researchers to reveal the path from attitude establishment to the actual behavior of consumer. The behavior is not always predicted by the attitudes. The relations described by the model are not cause – effects relation. They have to be seen more as a flow of problem solving. The potential buyer gains new experience by bearing in mind, selecting, acquiring and using a new product. The consumers' behavior affects his forthcoming conduct.

The major components of Nicosia model are: the characteristics of the organization, its statements and the psychological features of the potential buyer; the consumers' exploration for estimation of choices; consumers' driven action of acquisition; consumer usage of the product.

The consumer decision is illustrated as a flow chart. This flow chart presents the elements involved and the bond between them. The Nicosia model has four key fields. The first field presents the consumer attitude determined by the messages received from the company. The second field illustrates the exploration and assessment stage, the third one is dedicated to the acquisition act and the fourth field is related with the feedback process. Nicosia model is illustrated in the Figure 1.

The first field of the model takes account of altogether processes which takes the message from the organization to the consumer. It shows how the consumer designs his approach concerning products and services based on the manner of how he receives and translate the message. It has to subfields: one is dedicated to the product features and the second subfield presents the consumer characteristics, especially his predisposition. The marketing background of the firm and its communication efforts are included in the first subfield. The output of the first field is the consumer attitude.

The second field presents the direct reaction to the communication and is a so-called pre-action field. This field is dedicated to the search and evaluation stage, having as starting point the attitude established in the first field. The potential buyer will compare the analyzed brand with other competitor brands. Additional alternatives are listed and considered. If the company provided a good and

convincing communication, the potential customer is motivated to buy the provided product or the service.

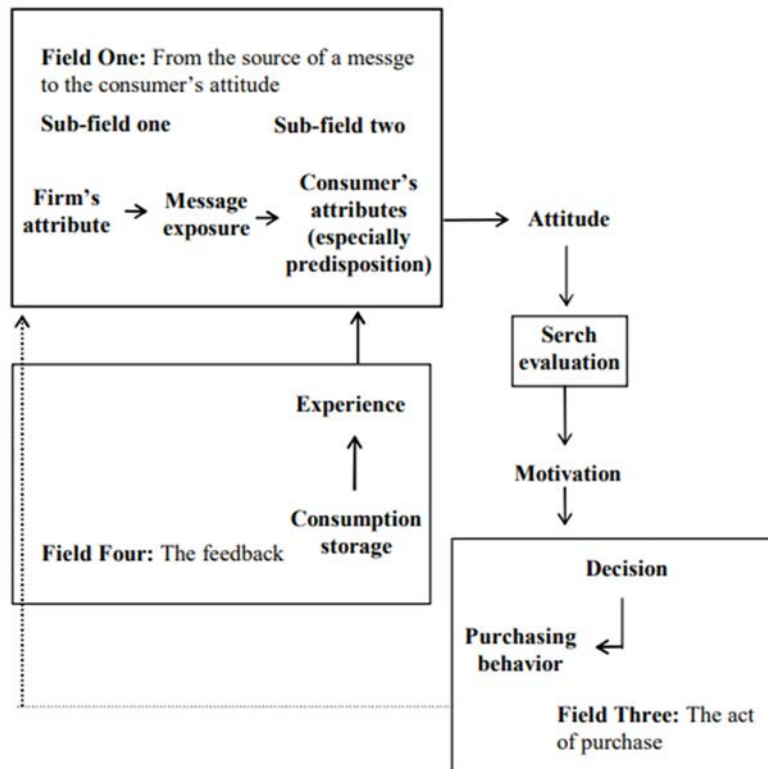


Figure 1: Nicosia model (Source www.ebookbou.edu.bd)

The motivation to buy is the output of second field and the input of third field. In the third field, the incentive to buy is converted in the action of purchasing. The act of acquisition leads to a convinced purchasing behavior.

The fourth field is dedicated to the feedback which occurs after the acquisition. The feedback is considered at both level: company level and customer level. The customer feedback becomes a new input for the company. It will redesign the message and the marketing policies in order to provide a better motivation for future buyers. The customer will have experience retention which will influence his future buying processes.

Applying Nicosia model for a Romanian berries producer

The pandemic made many changes in the buying behavior of food products. A higher concern for a healthy diet was noticed. People try to create a strong immunity in order to be protected as much as possible by Covid. They try to embrace a well-adjusted nutrition and a healthy existence. Older age groups were more concerned than the young groups. The studies revealed an increase in buying fresh fruits and vegetables. The berries producers benefit from this trend.

This investigation was done for a small berry producer from Bistrita County. His plantation was established six years ago and its surface is half hectare. The number of plants for this year was 1800. He decided to plant berries because they have a higher resistance at lower temperature, and the area where is located the plantation is a quite cold one. Another advantage is that this plant helps farmers to better use land with lower quality. The plantation does not have an irrigation system, aspect which imposes additional watering and causes decreased production. The size of the fruits is smaller because of the droughts.

The packaging is done in casseroles of small volume. The required quantity for home delivery is five kilos, because of high prices of fuel. The orders are delivered in the town or in a maximum 30 kilometers

distance. The price per kilo was about three euro. The rest of production is sold in small shops. A collaboration with supermarkets was desired but the quantity of the crop is too smaller to allow one to assure a continuous delivery at the required quantity.

The company done little marketing activities. The advertisement is done more through social media, especially by Facebook. The central message is based on the freshness of the fruits, the local provenience and the home delivery under some circumstances.

The first field of Nicosia model contains the following attributes: quality, freshness, local provenience and convenient delivery. If the analysis was done from the point of view of potential buyer, it was discovered that he cares more about the taste, the freshness and the price. The Nicosia model assumption that the customer does not have any knowledge or previous contact with this company was respected. The assumption of not knowing the product cannot be totally accomplished because all people know berries, but they did not know the visual aspect, the variety, the taste and the ratio price / quality. Majority of the customer mentioned as being important to support the local producers and the buy food from their area. This offers the guarantee of freshness and quality in their opinion. They suggested a diversification of packages from the point of view of the volume. Many considered to be useful for consumer to have a personalized pack and to include a logo of the company in order to be easy to identify in the shell. The insufficient advertisement was mentioned as a weak point.

The second field of Nicosia model is related with attitude and motivation. The customers consider different alternatives from different producers. They do not have a real image of which alternative brand or variety of berries are available. They associate more the other buying option with the shop which sell the berries. Only few of them read the labels and know information about the fruits they buy. More information is known about vegetables sold in Carrefour chain, because the hypermarket invested a lot in order to teach potential customers about its collaboration with Romanian producers. If are compared our berries with let's say "Carrefour berries", the conclusions are: the local producer brand is underestimated in comparison with the one from hypermarket, the freshness is considered better than the one from the big chain, the hypermarket has special offers and loyalty programs and the small producer cannot provide this, the local producer delivers home free for bigger quantities while Carrefour has some delivery constrains.

Third field converts the incentive to buy in the buying process. The potential buyer behaved as the previous researches revealed and made the acquisition decision for food and berries after discussions and recommendation of other persons. Their decision is also supported by the hope of keeping the path to a healthy style of life. About half of the persons who decided to buy the berries recognized that they rarely include fresh berries in the diet. It is more common for them to consume dry berries mixed with cereals or different types of chocolate products with berries.

In the fourth field, the consumer express his opinion after he bought and ate the berries. The buyer will tell the positive and negative characteristics from his point of view. His opinion influences other potential customers. The producer must collect this information and use it as a new input for his future actions. If a consumer is not satisfied, the company will try to isolate him in order not to remove others.

Discussion and conclusions

Nicosia model was applied for a Romanian berry producer. Quality, freshness, local provenience and convenient delivery are the main features considered by a potential consumer. In spite of the real qualities of the fruits, the consumers are more motivated by marketing activities of big supermarkets chains. There are required some changes in the market approach. A diversification of the packages from the volume point of view, the addition of company logo and a decrease of home delivery constrains are some of the proposed measures for short time horizon.

In medium and long run, the producer must implement dripping irrigation systems, plant new varieties of berries (example: Loch Ness) with higher productivity and a longer fructification interval. The new varieties of barriers plants grow straight and the harvesting process is much easier. In addition the distance between rows and between plants is smaller.

Last but not least, a better advertising is mandatory. Collaboration with cake shops, bakeries and companies which organize events for the children can increase the economical results.

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PERFORMANCE INDICATOR EVALUATION FROM THE HUMAN RESOURCE POINT OF VIEW FOR A SALES TEAM WORKING IN PANDEMIC

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Abstract

Purpose – *The goal of this study is to evaluate the performance expressed by motivation and work security, for a sales team which worked in the pandemic.*

Methodology/approach – *A model based on a non-financial methodology was used for evaluation of performance. The level of satisfaction and motivation of workforce defined the performance level and was computed as a function of five elements. The evaluation was done for the year 2021.*

Findings – *The average value of performance was 92,82%. According with literature review, a value higher than 80% characterize a high level of performance.*

Research limitations/implications – *The analysis was done only for one sales team. It can be extended to other teams from the same company, in order to compare them and see if such a high level of performance is specific just for one team, or is similar to all teams.*

Practical implications – *The model offers a high degree of flexibility for its implementation. It is a step towards evaluation of total performance of the organization. The model provides a clear and measurable assessment of performance.*

Originality/value – *Performance indicator from the point of view of human resources allows to evaluate the performance indicator as a function of personnel fluctuation, absence due to different reasons, work satisfaction and employees degree of participation with implemented ideas.*

Key words: *motivation, pandemic, performance, satisfaction.*

Introduction

The labor markets were strongly affected by the Covid pandemic. There were many restrictions at country and world level. Many national lockdowns generated perturbations at travel and work level. It was considered more secure to work from home and to decrease the contact with the customers. Some industries were able to perform inside of this framework, but other registered a decrease or collapse. There were implemented short time labor compensation schemes. The job insecurity generated confusion, depression and a transition to the more secured jobs (IZA, 2022).

Some jobs changed their full-time status. The immigrants took over the job loss at higher level than the nationals, in majority of developed countries. A very interesting fact is that education and not gender was the border for the people who remained at their jobs. (Goldin, 2022). Many managers adopted flexible work policies. More women had remote work than men. Due to gender equity issues, it is important to promote hybrid schedule also for men. The economic inactivity represent the number of persons who not work and who do not search for a job. It increase, as well as the unemployment increased. (Powel et al, 2022). Job retention schemes were designed at country level but also in many organizations which understood how important is to keep the qualified people. All these aspects strongly affected the performance at human resource level.

Labor performance in pandemic

The crisis situations strength the importance of a well done labor force assessment from the performance point of view. The remote and hybrid work made difficult the evaluation. The boundary

between job and home became fuzzy. The Society of Human Resource Management (SHRM) underlined some approaches of performance evaluation in pandemic: just in time feedback replaces traditional performance evaluation and the results are more important than the process. The communication role became more important in the team, being expected information satisfaction level. (Miller, 2022)

Another change generated by Covid was the periodicity of evaluation, less firms practicing the human resource performance evaluation. Other companies implemented different evaluation criteria or different weight for the performance features. A study done in Czech republic revealed that if before pandemic about one third of the companies proceeded a yearly performance evaluation, after Covid only about one quarter are doing it. (Cemerikova, 2022). Last but not least, the employee loyalty changed a lot. A great extent of the number of resignations was noticed. People reconsider their life and shift from job orientation to the family and private life orientation (Baird, 2020).

The Romanian labor market was affected by pandemic. Many measures were implemented by the government for limiting the spread of Covid. A greater level of unemployment occurred in 2020 in comparison with 2019. Mentality of employees changed a lot. The workers from closed sectors shifted to new jobs in other fields. They search for more jobs which offer health insurance and remote work. (Radulescu, 2020)

Measuring performance through function of motivation and security at job

The literature review presents many attempts to model the organizational performance. The most common methods of performance evaluation are using the financial approach and the quality approach. Nowadays the performance evaluation is not limited at financial elements, the non-financial one being added from different activities and processes performed in the organization. (Cooper D., 2019). This fact is explain by the fact than achieving the proposed financial performance does not assure the fulfilling of the other objectives (Borza M., 2017).

The aspects regarding the performance at human resource level are listed among the non-financial methodologies. A higher competitiveness at company level assumes the existence of a performance measurement system. This study has as starting point the model proposed by Fecete and Nedelcu in 2019. The level of satisfaction and motivation of workforce (SMW) allow to evaluate the performance. The model allow a high degree of flexibility in its implementation. The weight of each element from the performance function was calculated using the method of specialists.

The level of satisfaction and motivation of workforce (SMW) is a function of personnel fluctuation, work satisfaction, absence generated by sickness, degree of participation with ideas, number of days of absence due to work accidents.

$$SMW = a \times PF + b \times WS + c \times ABSS + d \times DPI + e \times ABSA \quad [1]$$

SMW - satisfaction and motivation of workforce;

PF - fluctuation of personnel;

WS - work satisfaction;

ABSS - absence due to sickness;

DPI - degree of participations with ideas;

ABSA - absence due to accidents produced at work;

a, b, c, d, e - the weight associated with each element.

The fluctuation of personnel (PF) is defined as the ratio between the number of personnel which left the company and total number of personnel. The ratio of calculated index to the planned index of fluctuation will be included in the performance formula.

$$PF = \frac{PL}{TP} \times 100 \quad [2]$$

PF - personnel fluctuation;

PL - personnel left;

TP - total number of personnel.

The value of work satisfaction (WS) is evaluated using qualitative and quantitative methods. It is measured in percentages and percentage deviation from the planned value will be used for SMW calculus.

Absence because of sickness (ABSS) is computed with the following formula. The fraction of calculated absence because of sickness and its planned value will be implemented in the performance index SMW.

$$ABSS = \frac{MABS}{MWD \times NP} \times 100 \quad [3]$$

ABSS - absence because of sickness;
MABS - number of medical absence days;
MWD - number of monthly working days;
NP – number of personnel in the analyzed month.

The degree of participation with improvement and implemented ideas (DPI) is calculated as the number of workers who generated an accepted and implemented idea for job improvement divided at the total number of workers from that department. The same as in the case of previous elements, the calculated degree of participation will be divided at the intended value.

$$DPI = \frac{NWI}{DNW} \quad [4]$$

DPI - degree of participation with improvement and implemented ideas;
NWI - number of workers who generated an accepted and implemented idea;
DNW - total number of workers from that department.

The absence due to accidents produced at work (ABSA) is computed as the ratio between the number of days when the person does not work because of a work accident and the number of worked days in that month. The value obtained by calculus will be reported to the targeted value and included in the final formula of performance index SMW.

$$ABSA = \frac{NDA}{NWD} \quad [5]$$

ABSA - absence due to accidents produced at work;
NDA - number of days when the person does not work because of a work accident;
NWD - number of worked days.

The initial model selected from the literature review included the risk matrix as an additional element in the equation of performance index. This risk matrix uses the minimum value among the number of measures taken in the last twelve months, number of measures realized older than one year and accomplishment of risk one measures. This study does not use the risk matrix because there is no risk matrix designed for the sales team.

The performance can take values in the interval one to ten. A value between one and five defines the area of nonperformance. A medium performance is given by values in the interval five to eight. Higher values than eight shows a great performance.

Performance evaluation for a sales team

The sales team was dimensioned at fifteen persons but because of the pandemic its size had fluctuation. The team sales auto parts and covers the area of some counties from Transylvania. Due to confidentiality reasons, the name of the company is not revealed. The team is dedicated for both individual and organizational customers. The team members worked either from the office or online from home. They could give support to their previous customers as well as bringing new ones. The time interval for the analysis was the year 2021. There were different types of restrictions and medical regulations generated by Covid pandemic.

The first step for performance evaluation was to calculate the weight for each element from the formula. This was done using the method of specialists. The specialists were the team managers and the sales manager. There were five teams. Each specialist gave a grade from one to ten for each element. The weight of the element was computed as the ratio between the score obtained by an element and the total score.

Table 1: Score obtained by elements

	S1	S2	S3	S4	S5	S6
PF	5	4	8	6	9	7
WS	7	2	4	5	5	6
ABSS	8	9	4	5	4	4
DPI	3	2	4	4	3	2
ABSA	5	5	4	3	1	2

$$a = \frac{39}{140} = 0.278$$

$$b = \frac{29}{140} = 0.207$$

$$c = \frac{34}{140} = 0.242$$

$$d = \frac{18}{140} = 0.128$$

$$e = \frac{20}{140} = 0.142$$

The monthly values of the five elements which define the performance expressed as satisfaction and motivation of workforce are listed in the subsequent table.

$$SMW = a \times PF + b \times WS + c \times ABSS + d \times DPI + e \times ABSA$$

Table 2: Calculation of Performance (SMW). [%]

	PF	WS	ABSS	DPI	ABSA	SMW
January	95	94	96	82	100	94,07857
February	98	96	98	76	94	94,18571
March	100	98	100	10	100	88,01429
April	86	100	100	44	87	87,04286
May	94	100	100	12	80	84,15714
June	100	92	100	62	100	93,45714
July	100	94	100	25	100	89,11429
August	100	90	100	91	100	96,77143
September	98	95	94	94	96	95,60714
October	92	98	96	100	93	95,38571
November	100	93	100	100	100	98,55
December	100	88	100	100	100	97,51429

The graphical representation of performance is illustrated in figure 1.

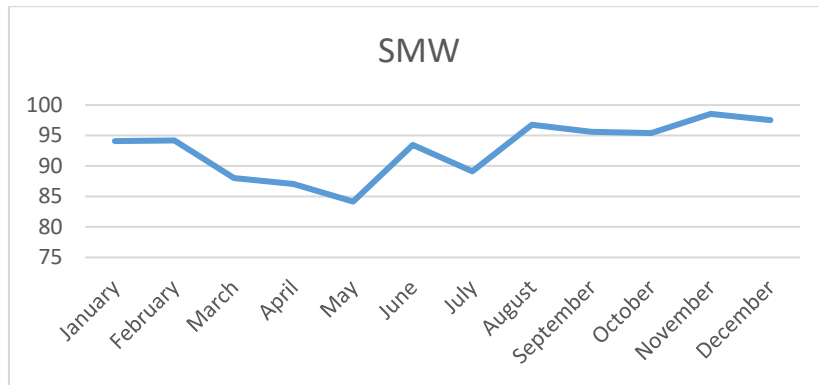


Figure 1: Monthly evolution of performance

The average value of performance is 92.82 %. This positions the sales team the level of high performance. The objectives are well scheduled and known by the team members.

Discussion and conclusions

The evaluation of performance by using satisfaction and motivation of workforce was done for a sales team which worked in pandemic. The analysis covered the year 2021. It considered five elements which describe the performance level: personnel fluctuation, work satisfaction, absence generated by sickness, degree of participation with ideas, number of days of absence due to work accidents. The value of 92,82% shows a high performance level.

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Section 2

VALIDATION OF THE PROCEDURE OF IMPLEMENTATION OF LEAN STARTUP APPROACH (LSA) IN SME

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Abstract

Purpose – Validating a proposed process to implement a new innovation method into small and medium-sized enterprises (SMEs) and deducting further steps in making the approach applicable. Helping SMEs to gain momentum in a globalized business environment.

Methodology/approach – In-depth interviews with experts from large enterprises, using the Lean Startup Approach (LSA), validation surveys with experts from both business and science.

Findings – The approach is useful and opens-up a valuable perspective for SMEs to innovate quickly and cost efficiently. Some aspects need to be more detailed and empirically validated.

Research limitations/implications – Since the approach has its roots in high-tech startup, a differentiated view on industry branches particular on SMEs would be important.

Practical implications – Further research and especially a pilot study inside SMEs would be beneficial.

Originality/value – Applying an innovation method that has so far mainly be used in startup and large enterprises by tapping into know-how from actual practitioners.

Key words: Innovation, SME, Globalization

Problem Statement and Overall Objective

Global megatrends like climate change, digital transformation, social inclusion movements and a further increasing globalization are affecting markets and businesses like never before (Jesemann et al., 2020: 595; Schaper, 2002: 525; Stocchetti et al., 2000: 3).

Digital change is the key challenge for industries as simple technical work will be replaced by machines and staff will have to meet new quality requirements. New business models based on disruptive innovation will be required.

This development has recently been reinforced by unexpected inflation, war in Ukraine and the COVID-19 pandemic (Zutshi et al. 2021), disrupting supply chains and driving up prices for producers and consumers. Consequently, governments release billions of aids and relief for enterprises and consumers all over the world, impose sanctions on warring parties and cut trade relations in favour of new partners, influencing supply and demand on a global scale.

All this makes the future more imponderable and thus poses greater risks for entrepreneurs making business decisions. Forecasts are becoming increasingly unreliable, making flexibility, agility and risk management of crucial importance. This applies to the area of product innovation and innovation management, as successful innovation often determines the medium and long-term business perspective of enterprises. Slow innovation without constant feedback from existing and potential customers exposes corporations to risks of being overtaken by their competitors or new global trends and thus being squeezed out of the market. Simultaneously, lost investments in newly developed products which fail on the market can be devastating, especially for smaller businesses. While startups are generally more agile due to their lean structure and their focus on new products and large enterprises hold many resources and dominant market positions, small and medium-sized enterprises (SMEs) are

often particularly vulnerable to such challenges (Gamage et al., 2020: 2), nevertheless they play an very important role in the economy of many countries and regions.

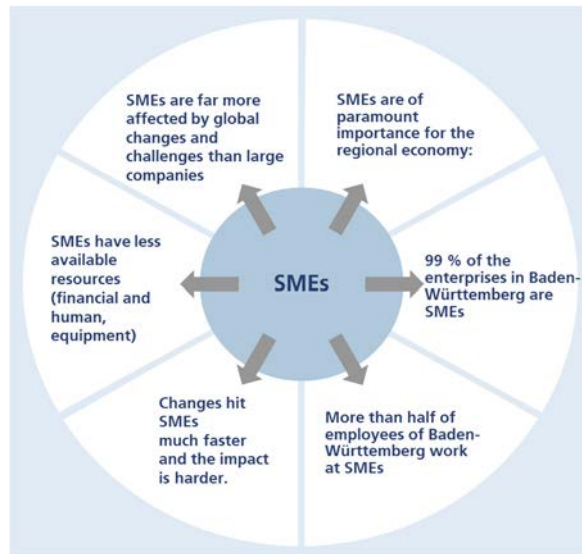


Figure 1: Role of SMEs in the economy and reasons for their vulnerability

Companies can only survive if they continuously innovate. However, this is not about improving existing products and processes. To be viable in the future and even to be able to play in the top league, incremental innovation is not enough. The survival strategy is to innovate disruptively, to react quickly and efficiently to market needs and to offer new products, solutions and services that meet the market needs. Thus, it becomes increasingly clear that traditional innovation methods struggle to keep up with the modern and fast changing needs of markets.

Prior Investigation

From these preliminary considerations, three main questions were formulated:

1. Which innovation methods are currently being used?
2. Which innovation method is most suitable and beneficial for SMEs?
3. How can it be implemented?

In first step, the authors conducted literature research in which the authors investigated traditional and current innovation methods, used by startups and large enterprises and compared them with each other.

	Large Enterprises	Startups
Initial Conditions	<ul style="list-style-type: none"> ▪ High personnel capacity ▪ High financial resources ▪ Years of experience in product innovation ▪ Dedicated R&D-departments ▪ Innovation processes run parallel to daily business ▪ Failure in the innovation process rarely decides on the entire existence of the company. 	<ul style="list-style-type: none"> ▪ Low personnel capacity ▪ Low financial resources ▪ Little to none experience of product development ▪ No dedicated R&D-departments ▪ Product development processes is the only business ▪ Failure in the innovation process decides on the entire existence of the startup.
Resulting Procedure	<ul style="list-style-type: none"> ▪ Multilevel innovation procedures with a high degree of standardization ▪ Highly professional, perfected through years of improvement <ul style="list-style-type: none"> • Complex • Lavish • Time consuming • Expensive 	<ul style="list-style-type: none"> ▪ "Spiral-shaped" product development, with numerous feedback loops, based quick decisions <ul style="list-style-type: none"> • Quick and efficient • Lean and agile • Low costs • High performance

Figure 2: Conventional Innovation Methods in Large Enterprises vs Startups

The authors collected and evaluated the most promising strategies for innovation and weighed their strengths and weaknesses. They found the LSA to be the simplest and fastest and therefore most efficient way to innovate.

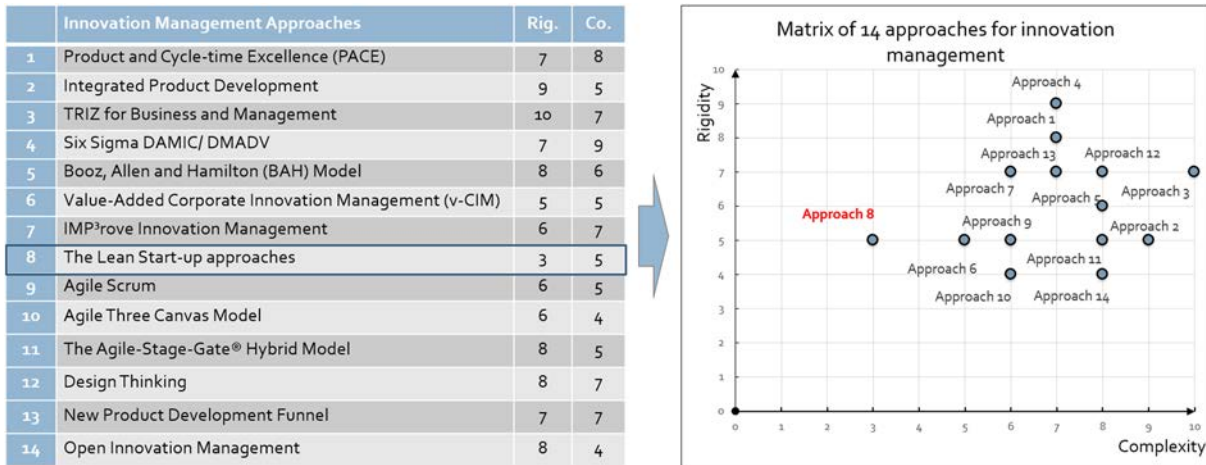


Figure 3: Comparing innovation management methods in terms of complexity and rigidity

Modern agile methods attempt to meet these challenges through a quicker, customer-oriented and iterative innovation process. One such approach is the Lean Startup Approach (LSA), a method used by innovative and fast-growing tech startups to innovate cost-effectively.

A central point of the method are customer interviews. The central point of product development is based on presenting a simple solution design called “Minimum Viable Product” (MVP) to the customer(s) and improving and developing the initial design to market readiness through permanent customer feedback.

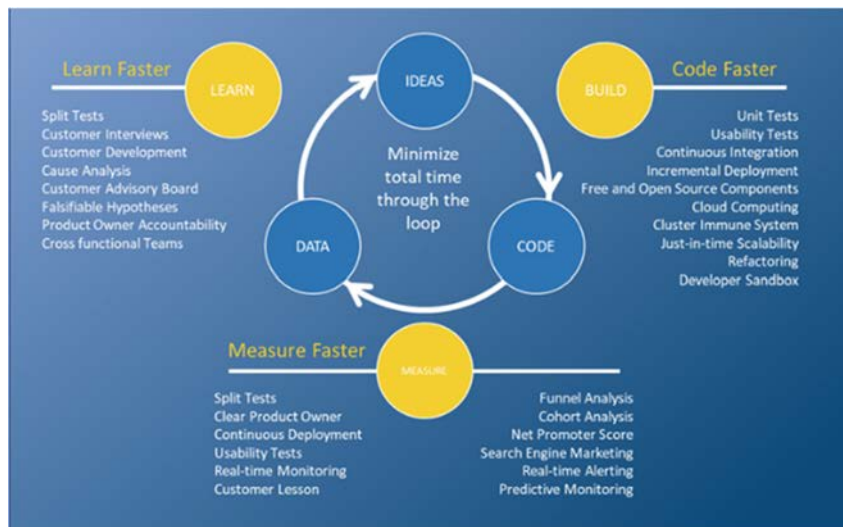


Figure 4: Graphic representation of the LSA according to Eric Ries

Through this customer-orientation, initial market approaches carry fewer risks of failing, while at the same time the process is more cost-efficient due to the use of MVPs and the innovation process able to be stopped or shifted at any time.

In next step the authors conducted expert interviews with practitioners from large enterprises already using the LSA to harness experiences in businesses greatly larger than startup. Challenges encountered by these, and other enterprises were then adopted as questions in the expert interviews.

The expert interviews conducted comprised of 15 experts from large enterprises and had experience with innovation management, particularly with the LSA. The main questions were:

- Why did the enterprise decide to try out LSA?
- What were the biggest challenges? What were the biggest benefits?

Although the experts came from different industries, countries and sectors, the responses were by and large very homogeneous, and the survey can be summarized as follows:

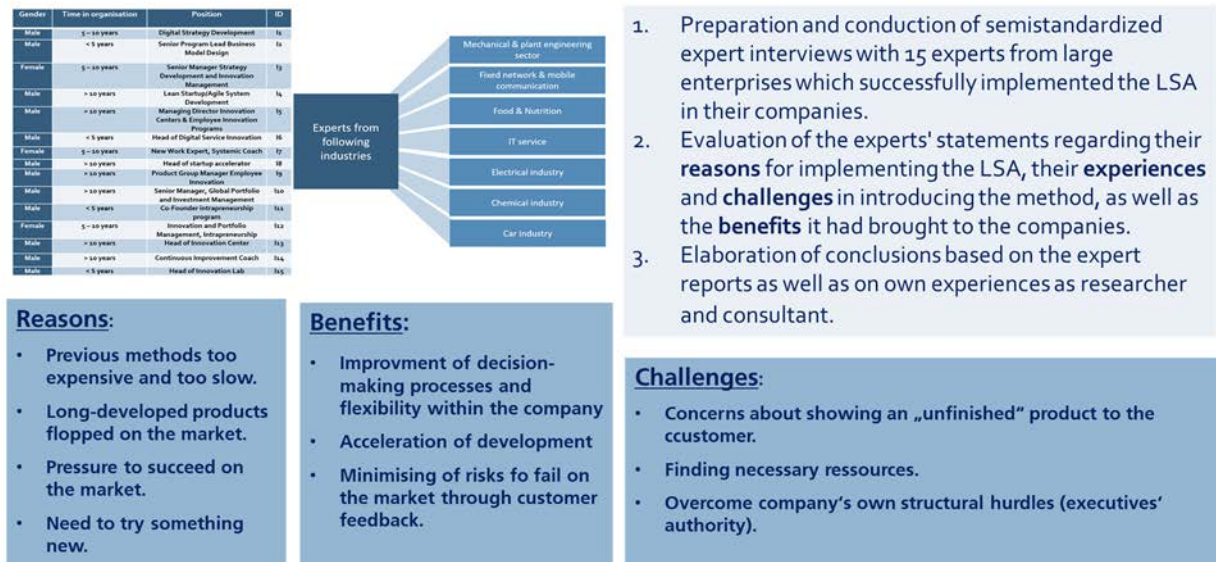


Figure 4: Interviews with Experts from Large Enterprises which implemented LSA

The experts gave prolific insights into the reasons why LSA was initially invented in their companies, their biggest challenges while implementing and their greatest benefits. They also described the difficult process of involving customers showing them unfinished MVPs yet collecting valuable feedback. The most important finding, however, was that the LSA can be migrated to and successfully applied in SMEs. The authors used these learnings to:

- describe a procedure for how to implement LSA in SMEs,
- give valuable preliminary advice for SMEs aiming to implement the LSA into their innovation framework,
- formulated step-by-step instructions with challenges that can be expected and possible solutions to these challenges.

The process was described in two sections:

1. Prerequisites and Preparations prior to the LSA implementation
2. Steps of the actual LSA-Implementation

The first section (*Prerequisites and Preparations*) consists of four issues or action areas that managements must address before the actual process of LSA implementation can begin. This section is divided into:

1. Preliminary considerations
2. Preliminary Actions
3. Upfront measures and
4. Familiarisation with the method.

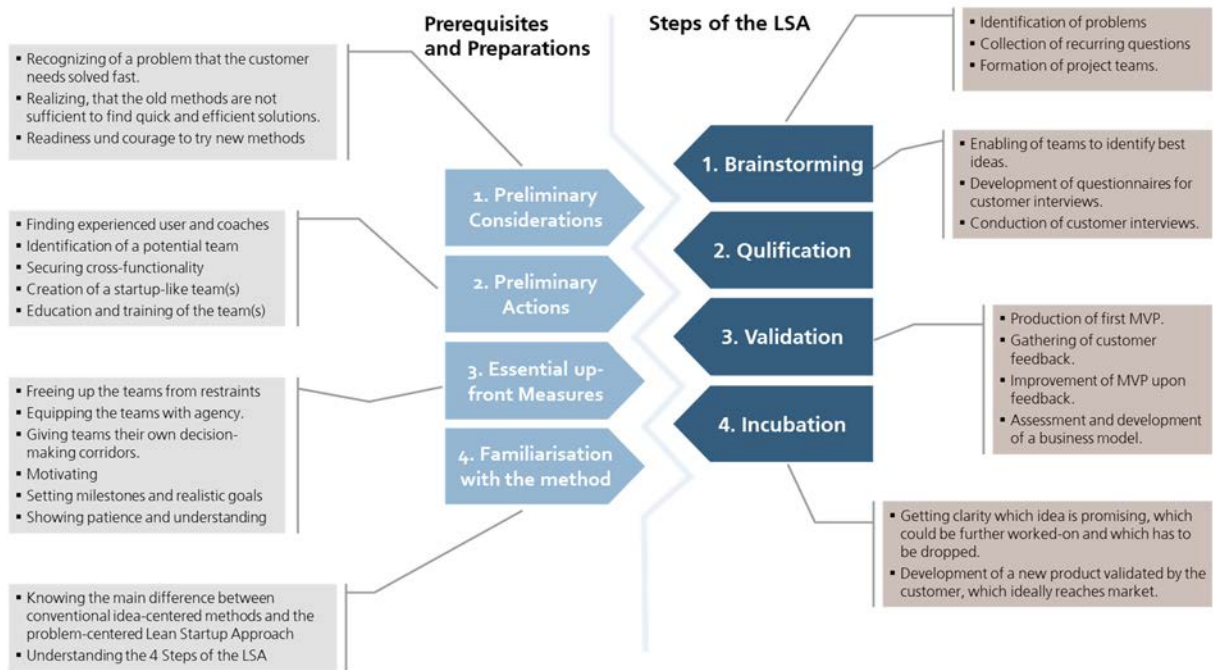


Figure 5: Process of implementation of the LSA in SMEs including Prerequisites and Preparations

The key point in this section is the realization that the company does not have a product that can survive on the market in the long term and that incremental innovation can no longer bring success. Each topic is complemented by possible challenges and valuable solutions based on the experience of the authors and the insights gained from the interviews with the experts.

The second section is a step-by-step guide consisting of the four steps for the implementation of the LSA. At each step, goals are defined, and exemplary time frames based on the experts are suggested.

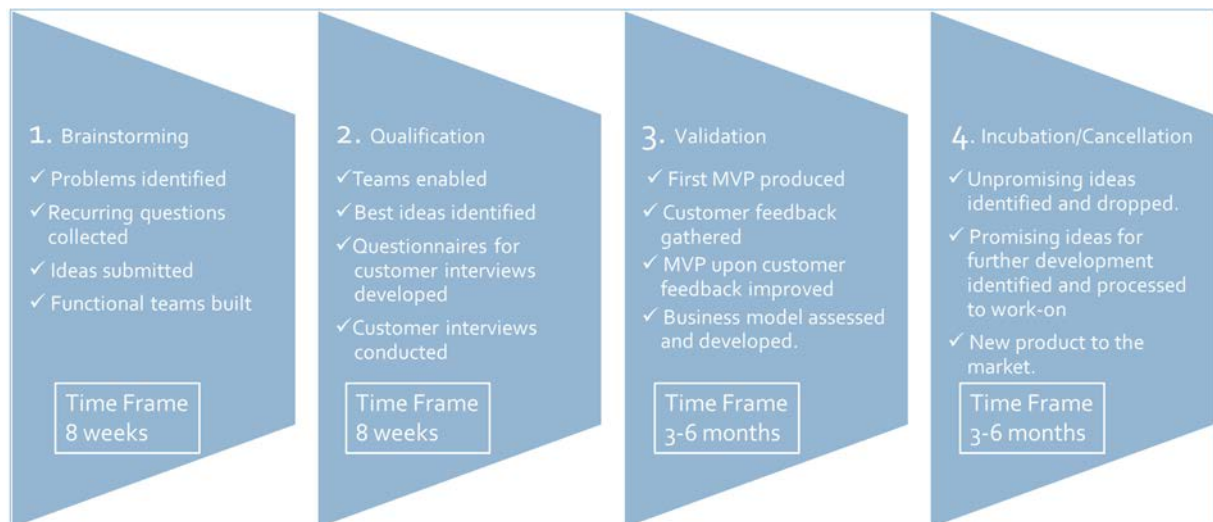


Figure 6: Four proposed steps to implement the LSA including goals and time frames

Scope of this Article

In this article, the authors aim to prove that the described approach to implementing LSA in SMEs is understandable, comprehensive, and feasible. The goal is to validate the defined step-by-step procedure for introducing the LSA in SMEs, the additional advice given on prerequisites and preparations, and the challenges, solutions and suggested good practices described. For this purpose,

13 international validators (1 Polish, 1 French/Tunisian, 1 German/Rumanian, 3 Romanian, 7 German, 7 male, 6 female) from business/SMEs (6), academia (2) and science/consulting (5), were selected to verify the above points and confirm their accuracy and completeness.

In addition to an extensive presentation on the subject area, the research goals and the description of the procedure, the validators received a questionnaire with questions regarding the completeness, comprehensibility, and feasibility of the procedure. Furthermore, they were asked to add comments and an overall assessment.

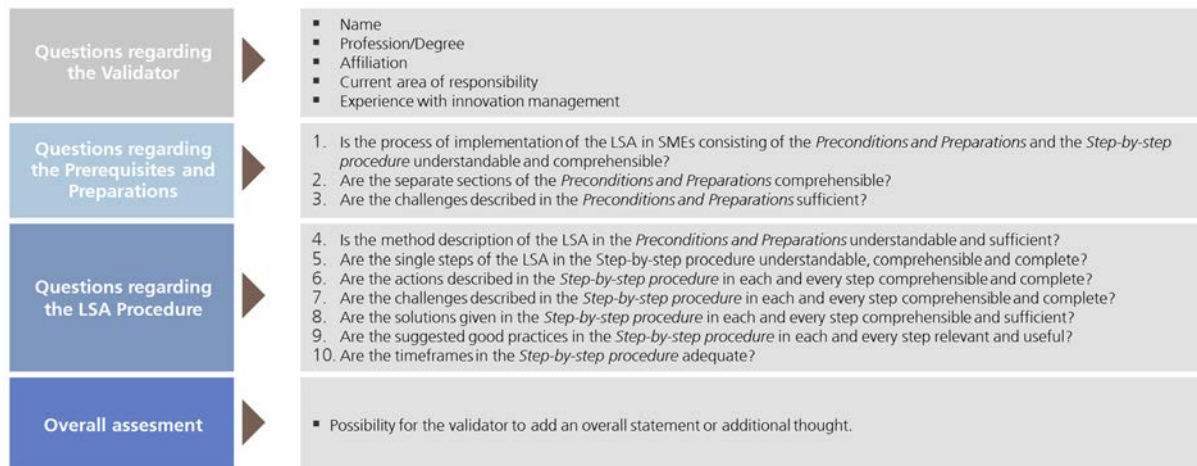


Figure 7: Questionnaire for the validation process

Results of the Validation

The overall feedback was positive. All validators saw a need to support SMEs at their innovation management. Validators 2, 10 and 11 answered yes to every question. Validator 10 additionally confirmed the "yes" with a comment.

On question 1 validator 1 commented that it might be difficult for companies to realize that the old method is no longer sufficient. Validator 3 criticised that speed is not the only topic SMEs should focus on while innovating. In contrast, according to expert 7, SMEs tend to ignore the fact that they need a new approach for as long as possible, so when they notice they need a quick solution. This underlines the authors' thesis regarding importance of speed.

On question 2 validators 10 and 13 remarked that "all [preconditions] merge and influence each other] and therefore should not be seen separately.

On question 3 validator 1 suggested adding industry-specific challenges, while validator 4 demands inclusion of innovation culture of the company. Validators 10 and 13 found the described actions understandable, but being no dedicated LSA experts, could not verify completeness.

On question 5 validator 3 wished more details and expert 4 felt that "there should be a Step 5 after incubation where the solutions are transferred to regular activity and the cycle is restarted."

There were no additional comments on **question 4**.

On question 5 validators 3 and 7 wished more details regarding practical use, while validator 4 suggested implementing a step 5 after incubation in which "the solutions are transferred o regular activity and the cycle is restarted"

On question 6 validator 1 noted that more details should be given on how to gather information about customers. Meanwhile validator 3 missed "a quality gate" after each step.

On question 7 validator 1 proposed adding “industry-specific challenges” and validator 6 suggested integrating two different types of interviews 1) customer discovery, where unique “pain points” are pointed out, before moving on to 2) validating MVPs.

On question 8 validators 3, 4 and 7 sought for more details. Validator 9 saw a challenge in the existing innovation culture.

On question 9 validator 4 stated that the solutions and good practices given are a good starting point but suggested they could be expanded and detailed as well as supplemented with examples. Validators 3 and 7 suggested a more detailed description, too.

On question 10 validator 6 remarked that the time frames given might be object to very high variability and need to be backed up by data.

In the **overall assessment** section, almost all validators took the opportunity to add comments. Validators 1 and 2 considered the approach very interesting and valuable. Validator 2 said: "It can bring great value as supplement to the existing innovation methods". Validator 11 stated the process description was very well presented and regards "the approach [as] understandable and in line with practical experience". While validator 8 wished for an extended description for SMEs, validator 12 suggested a "fast-track procedure" for SMEs.

Validator 9 was remarkable sceptical, seeing the main contribution of the authors only in the description of the preconditions. He also questioned whether LSA that originates from the technology startups would also work in manufacturing companies without adaptations. Further, he noted that the success of startups lies in their ability to create new business models and educate the market on how to adapt to technological disruption. In this regard, LSA would have shortcomings as innovators listen only to individual customers rather than creating new markets for new products. In his opinion the unique value propositions combined with a new business model is key to success rather than “too much feedback from individual customers”. In contrast, the other 12 validators agreed on the great potentials and advantages of the method.

Overall, a slight disparity between respondents from business, academia and consulting could be observed. While the proposed steps were mostly very well received, validators from academia/consulting were particularly positive. This can best be demonstrated with a quote from validator 2: “For me as a researcher and consultant on innovation everything is evident and comprehensible. The approach is very interesting and modern. It can bring great value as supplement to the existing innovation methods. However, from my experience I would expect SMEs to be sceptic out of fear that not every possible challenge has been addressed and explained and something could be missing. It is therefore important that the process description not only recommends the use of a coach but makes this a prerequisite”.

Conclusion and Implications for Future Research

Besides the predominantly positive feedback, the validators contributed some aspects to complement the research. Some comments like investigation and consideration of varying innovation cultures of enterprises as a factor of influence of innovation activity were considered in the authors’ research but were not included in the briefing.

One suggestion mentioned several times was the inclusion of specific requirements, peculiarities and challenges of companies operating in different industries, especially with a differentiated analysis of technology or production companies. However, based on the results of the expert survey conducted prior to the validation, the authors believe that the method is applicable without predefined industry specifications since the interviewed experts came from a wide variety of industries. The adaptation to the needs of individual branches or even companies should therefore be worked out individually in the preparation phase in cooperation with the coach, because here the specification can be tailored exactly to the needs of the company. A predefined industry specification would elevate the method to a meta-level and restrict it.

The question of the applicability of LSA in SMEs was also raised. The expert interviews provided the statement that the method can also be applied in SMEs, and no indications were discernible that the approach would have to be fundamentally modified. On the contrary, the authors assume that all

necessary adjustments can also be made in the preparatory phase. A specification that is too concrete would go far beyond the generally applicable process description.

The question regarding the actual purpose of the customer interviews, namely are they used to evolve the product only or the overlaying business model, seems justified to the authors. Therefore a two-step-interviews including both topics will be considered in further research.

In summary, the two most important findings of the validation upon all experts agreed were that

1. there is a great need to support SMEs in their innovation activities and
2. that LSA is a valuable supplement to the existing innovation methods.

Interesting finding was the difference in the comprehensibility of the described process between the validators from academia, business, and science/consultancy. While the academic validators were focused mainly on the formalities, and the SME representatives feared gaps in the description of the process and wanted more details or an accompaniment by a coach, the researcher/consultants seemed to be best able to deal with the information given. It is explained by their scientific research and practical approach to innovation management. After all, they would be the coaches in such processes.

It became clear, that to be applicable especially by smaller enterprises, the LSA should be coached and facilitated from outside of the company. This is consistent with the findings from the expert interviews. Since the approach is loosely formalized by its nature, it thrives on practical experience, which raises the need of a “hands-on” mentality and outside know-how. The expert interviews stressed that most of the concerns (like presentation of an MVP or how to conduct customer interviews) dissolved quickly once the first hurdle of trying it has been overcome. Hence, the most important step is the decision to open-up to the approach. Since every company is different, each company does benefit from figuring out the specifics of each step in their own business exploratively, regarding their own products, processes, and customers.

Overall, LSA may seem intimidating at first glance, as it is rather vague and not very formalized, and the customer interviews seem unfamiliar. However, therein lies its greatest strength. Few formalities give maximum flexibility and constant exchanges with customers provide immediate validation. This leads to the fast pace and low resource requirements, making LSA an effective method for companies of all sizes. However, to realize the true potential of the approach, the involvement of external coaches is the key factor.

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A MANAGERIAL PERSPECTIVE OVER THE CHANGES IN THE EDUCATION OF THE POST PANDEMIC SOCIETY

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Abstract

Purpose – Because the COVID-19 Pandemic has accelerated digitization of the Romanian education system, Romania could be in 2022 the country where the transition to digitalization of the education could have the most accentuated rhythm among all European countries, although Romania ranks 27th of 27 European Union Member States in the 2021 edition of the Digital Economy and Society Index. The accelerated use of Information and Communication Technology during COVID-19 Pandemic, will change the future of the Romanian Higher Education System?

Methodology/approach - The research methodology was based on two surveys performed through questionnaires. First was composed of 18 questions and applied to a population of 700 respondents and the survey period was between 2 and 7 May 2022. The investigated population, the respondents, were students of the University of Petroșani at the bachelor and master studies. The second questionnaire had 19 questions and was applied on 59 teachers of the University of Petroșani and the survey period was 3 and 5 March 2022.

Findings – Society in general and the higher education system in particular have changed after 2 years of pandemic. All those involved, students and teachers, believe that the process of change is still ongoing.

Research limitations/implications – Even if the respondents, as mentioned, are only from the University of Petroșani, the study can be extrapolated to provide an image for the Romanian education system.

Practical implications – Even if one of the most severely affected areas of human activity by the COVID-19 pandemic was education, now in the post pandemic reality one of the benefits of this pandemic will be probably the re modelling of the educational system, most likely the higher one, in a hybrid format.

Originality/value – The purpose of this research is to find the best method for adapting the University of Petroșani as quickly as possible to the new context of hybrid education model that is being implemented in Romanian higher education system.

Key words: Romanian education system, COVID-19, Mixed education, Digital education, Management perspective

Introduction and background literature

The effects of the COVID-19 pandemic in education have been a concern for all those involved in this field, pupils, students and their parents, teachers, researchers, leaders in education, government. This concern meant the effort to adapt to the new conditions, but also the preparation for the post-pandemic period. Because this preparation cannot be done without evaluating the effects, the researchers tried to identify which were the most relevant aspects highlighted by the pandemic time.

Thus, Ożadowicz, A. (2020) starts in his research from the premise that the blockage caused by the COVID-19 pandemic did not only have negative effects, as in fact happens every time when an impact event occurs. Forcing the decision makers to find solutions to support the education system during the period of blockage, eventually led to a discussion on the need to modernize teaching methods. According to Ożadowicz, A. (2020) the possibility of using combined and hybrid learning is feasible and

to be researched, so that students to benefit from an improved learning framework. (Ożadowicz, A., 2020) Lau, S.S.S. et al. (2021) conducted a study to clarify whether the use of blended learning, experienced by Hong Kong during the COVID-19 pandemic, affects the model of creating a career course. The authors' conclusion led to the confirmation of the hypotheses that the use of this way of learning is beneficial. Therefore, the direction proposed by the authors aims to create a holistic curriculum on the full development of young people, with a view to a better transition for them in the labor market. (Lau, S.S.S. et al., 2021) The research conducted by Sobaih, A.E.E. et al. (2021) tried to determine the extent to which the use of social media or a dedicated tool such as Microsoft TEAMS were effective in supporting education in the Egyptian university environment, more specifically among hospitality students. While social media had the advantage of a better framework to receive the support of teachers or colleagues, Microsoft TEAMS was considered more suitable by students for the assessment component, but also for that related to real feedback. Thus, it is concluded that both the decision makers in education, but also the researchers who generate trends or changes in education should use these experiences appropriately. (Sobaih, A.E.E. et al., 2021). Most probably, if the universities that used Microsoft TEAMS during the pandemic period, had used other applications from the Microsoft family, such as Yammer, the research done by Sobaih, A.E.E. et al. (2021) would have had a slightly changed result. Alyahya, M.A. et al. (2022) analyzed the impact of imposing the use of e-learning during the COVID-19 pandemic on students, from the perspective of gender differences, with the possibility of conducting this study in gender segregated cultures, as is the case in Saudi Arabia. The results of the study showed a better adaptation to e-learning for female students, who obtained better results. The study also indicated the need to combine conventional education with e-learning in the post-pandemic period. (Alyahya, M.A. et al., 2022) Kanetaki, Z. et al. (2022) performed an analysis of the results obtained by students, starting from the moment when the COVID19 pandemic was triggered, during which time the activity took place exclusively online and later, when they switched to a hybrid regime. The authors found that the need to study the theoretical component was explicitly relevant, the results obtained by students being affected by this component. The evaluation of the students had a good success rate, without being able to establish a relationship with the participation in the courses, either online or face to face. The analysis performed by Kanetaki, Z. et al. (2022) also allowed the development of a model for predicting the results obtained by students, which can provide the necessary support for better adaptation of the hybrid educational system to the needs of post-COVID society. (Kanetaki, Z., et al., 2022) Xing, X. et al. (2022) found that the quality of online education was affected by internet access and the environment in which students were during online classes. In addition, the authors found that one solution to overcome the disadvantage caused by Internet access for participation in synchronous online education is to use the blended learning system, which can increase the effectiveness of learning outcomes. (Xing, X. et al., 2022) Sobaih, A.E.E. et al. (2022) identified the need to study the use of social media application in education, in the absence of an e-learning management system. This situation was more common in developing countries and was practically the solution that was used during the pandemic of COVID-19, to support educational activity. Starting from today's youth culture and using the theory of planned behavior, along with the model of acceptance of technology, it was found that the analysis led to a useful conclusion, namely that social networks can be a major tool for communication in academia. Moreover, the integration of social networking resources for the higher education system, in the absence of a digital education management system, can become a good choice for strengthening the sustainability of universities. (Sobaih, A.E.E. et al., 2022) Escobio-Prieto, I. et al. (2021) identify through their study the downside of the forced transition to online education caused by the COVID-19 pandemic. The analysis was done among health science students and found that physical therapy students suffered greatly during the emergency caused by the COVID-19 pandemic. In addition, it was found that universities had tools to enable virtual education, but that these tools were rarely used before the state of emergency. What is relevant to this study is that it highlights the need for continuous observation of student satisfaction, closely related to the possibility of using a very well-balanced hybrid education system. (Escobio-Prieto, I. et al. 2021)

Methodology

The research methodology was based on a survey performed through a questionnaire containing 19 questions and applied on 59 teachers of the University of Petrosani, during 3-5 March 2022. This managerial research was based on the answers provided by 59 teachers of the University of Petroşani, that represent 59% of the investigated teachers and 45% of the total of the university teachers, so it was a representative research (Figure 1). The 19 questions of the survey were organized into 3 sections and 10 directions that could support the future development of the University of Petrosani in the authors

opinion, and the relevance of the respondents from the perspective of teaching degree of the teaching staff is 45%.

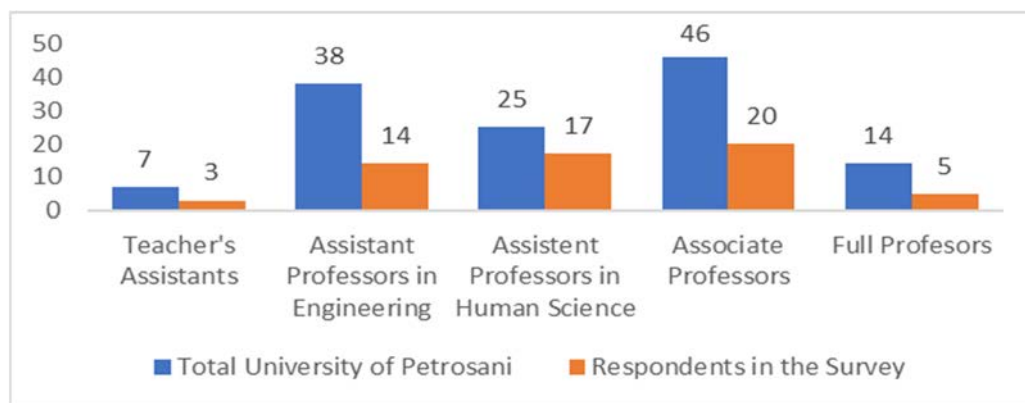


Figure 1. The relevance of the respondents from the perspective of teaching degree of the teaching staff.

Findings and discussions

We are at the moment when the prospect of returning to the context before the onset of the global pandemic caused by COVID19 no longer exists and not because we no longer want to, but because the world has changed. We have all changed, but society has changed the most, the younger generations have undergone essential changes. We can look to the past for an analysis, but much more important is to look to the future using the experience of everyone in this period.

As is already known, in Romania, article 139 of the National Education Law was changed in May 2022 "...Some activities in the form of face-to-face education can be carried out through the specific electronic, information and technology communications resources, settled in quality standards developed and approved by ARACIS" (Romanian Agency for Quality Assurance in Higher Education). (Romanian Parliament, 2022) The authors have anticipated these changes of the Romanian HEI and in their papers published last year stated that, "...education will become, in future, more and more a hybrid one". (Edelhauser E., et al., 2021)

In this context the answers to the first question of the survey applied to the teachers of the University of Petrosani, showed in Figure 2 that teachers anticipated the changes of the HEI system, two months before and consider in a 70 to 80 percent, that probably we will have fundamental changes in the education system in the post pandemic society.

Being a small university of Romania focused more on education than on research and development, University of Petrosani has a few deficiencies in the field of research. Also, because inside the Romanian HEI the competition and rankings are based more on research results (Ministry of Education, 2022b), the teachers indicated the first priorities as creating research teams with scientific production and involvement of teachers in research projects. But after the two pandemic years, the third priority mentioned was the development of educational platforms, considering that the future education will be a hybrid one, as it can be seen in Figure 3 as a result of question 3.

Because education in Romania is underfunded (The Fiscal Council of Romania, 2021) and because the salaries of young teachers are low, a possibility to supplement salaries is represented by the involvement of university staff in the implementation of projects. In this context the answers to question 6 showed that the development of a department dedicated to writing funding applications for projects, represent the first priority in the teacher opinion, and developing a hub for creativity, innovation and invention or a research development cluster, represent only the second option (Figure 4).

Analyzing the academic campus development as a pillar of a future development of the university, the authors have investigated the teachers of the University of Petrosani, regarding the priorities of the academic campus development, and because our university is a comprehensive one, but mainly focused on engineering, the most important direction must be the upgrading of the laboratory equipment (Figure 5).

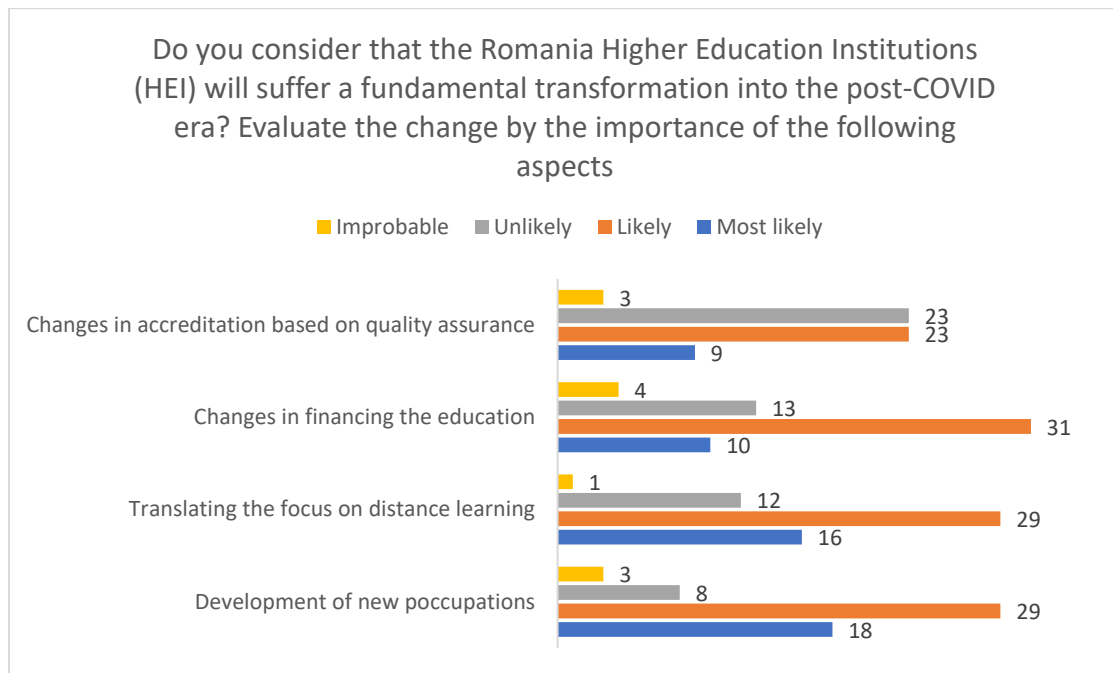


Figure 2. Question1 - Do you consider that the Romania Higher Education Institutions (HEI) will suffer a fundamental transformation into the post-COVID era? Evaluate the change by the importance of the following aspects

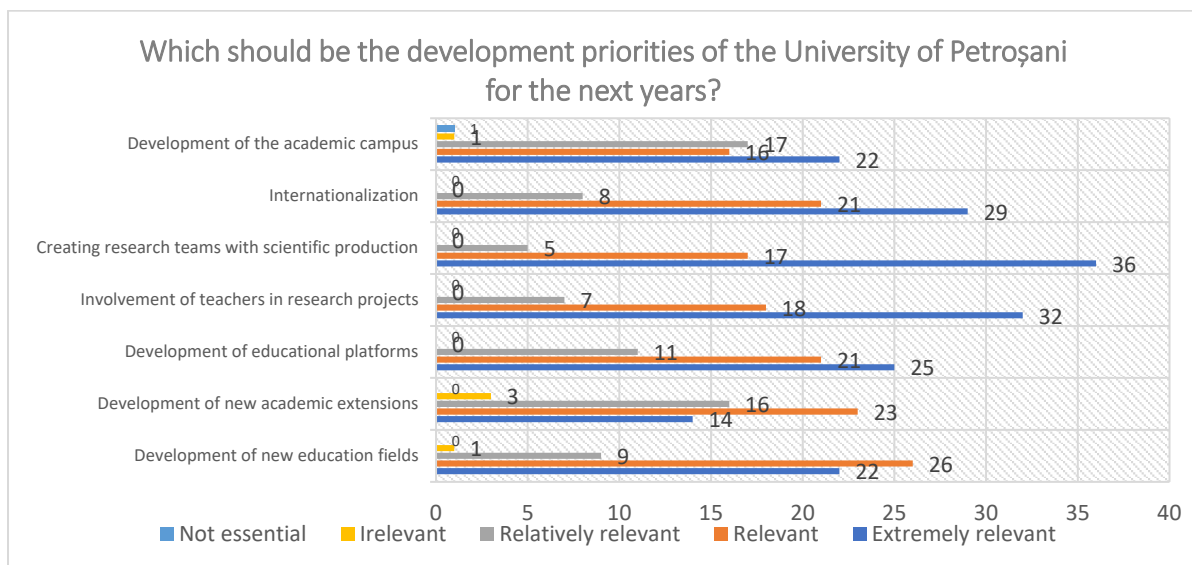


Figure 3. Question 3 Which should be the development priorities of the University of Petroșani for the next years?

Another problem of the Romanian education system is the financing of the universities based on the number of students, and in this context the first option of the teachers for increasing the economic efficiency is to rise the number of the students, even if stimulating research excellence to increase the funding obtained by the university from the government and a more efficient use of the human resources represent much more normal options for increasing the economic efficiency of a HEI (Figure 6).

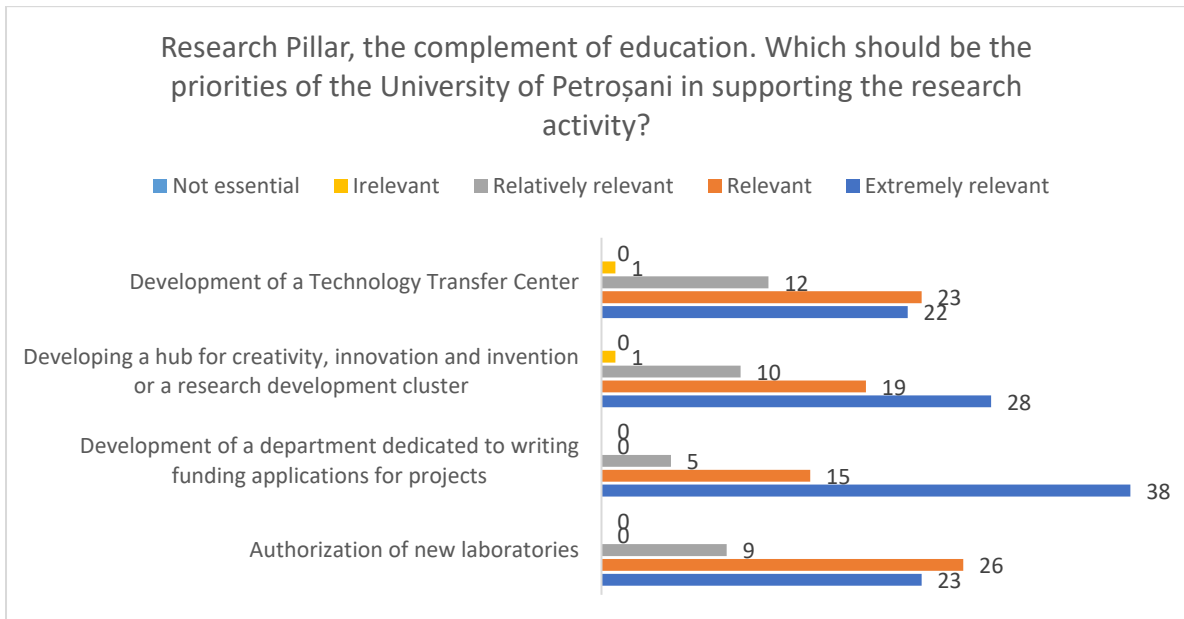


Figure 4. Question 6 Research Pillar - the complement of education. Which should be the priorities of the University of Petroșani in supporting the research activity?

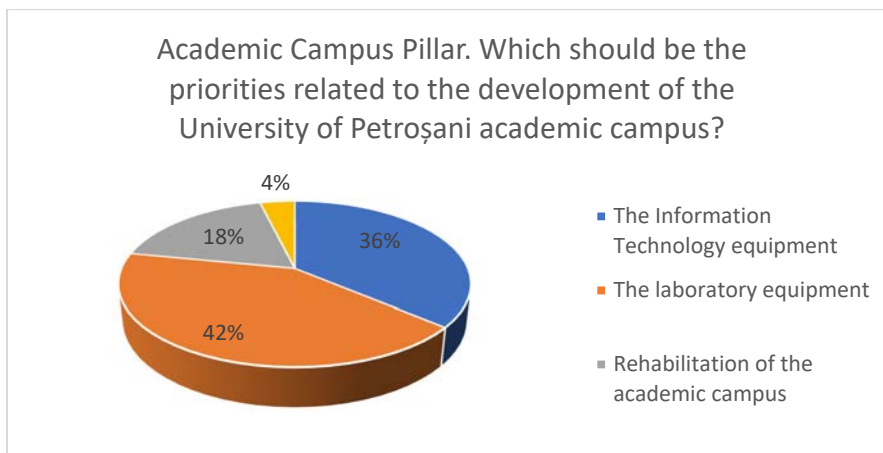


Figure 5. Question 8 Academic Campus Pillar. Which should be the priorities related to the development of the University of Petroșani academic campus?

In the context of the answers offered to question 10 (Figure 7), the authors hope that adapting the classrooms with videoconference equipment and training of teachers for online education will be a priority of the University of Petrosani in the following 10 years, according to the project that will be implemented through - Grants for the digitization of universities funded by PNRR 2022 (Ministry of European Investments and Projects, 2021) - Component C15: Education Reform 5 (Ministry of Education, 2022a): Adopt the legislative framework for the digitization of education - Investment 16: Digitization of universities and their preparation for the digital professions of the future.

Conclusions

The research carried out by the authors using as respondents 59% of the university teachers, teachers that will constitute the academic body that will support the implementation of the management plan of the future rector of the University of Petrosani for the term 2024-2028, is unique for the University of Petrosani. The survey had the role of structuring a future management plan but also identifying the development priorities of the university in a new hybrid education context, two months before the ministry of education have decided that the 2022/2023 academic year should be a hybrid one.

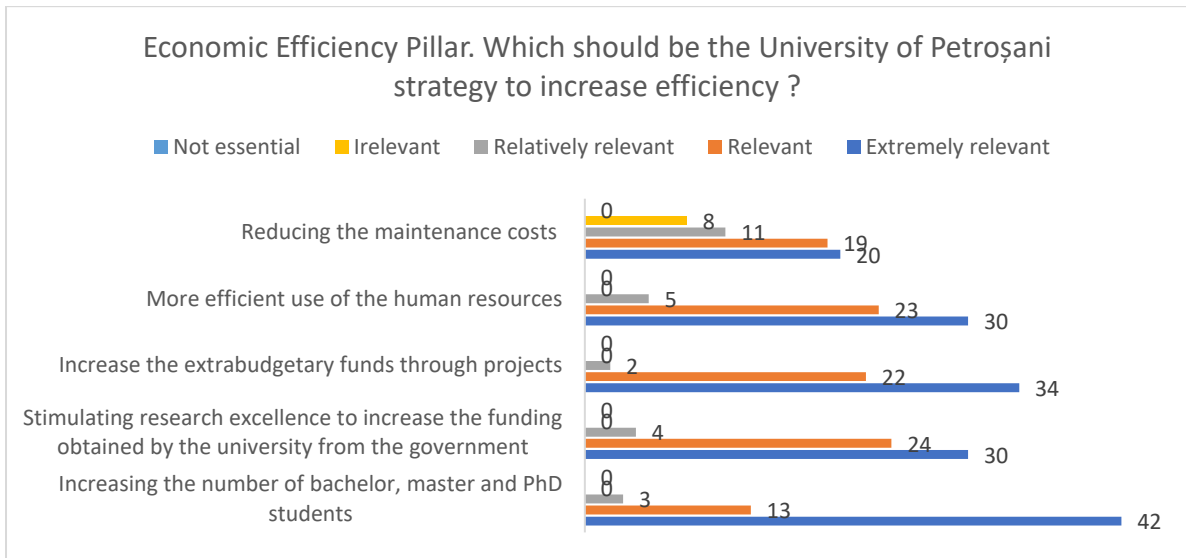


Figure 6. Question 9 Economic Efficiency Pillar. Which should be the University of Petroșani strategy to increase efficiency?

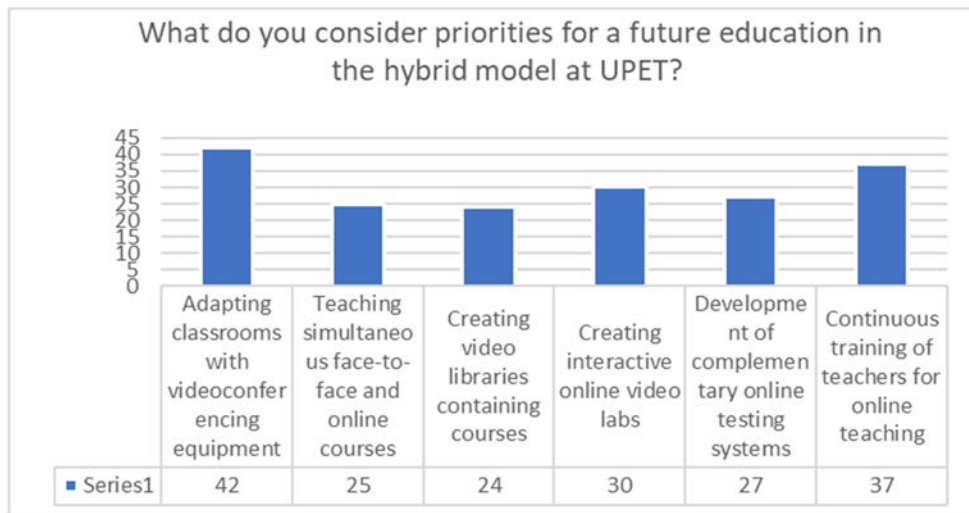


Figure 7. Question 10 - Educational Infrastructure Pillar - What do you consider priorities for a future education in the hybrid model at UPET?

After two years of online education, the concept of academic education in Romania is completely different, a fact revealed also by a second research conducted by the authors. This survey was composed of 18 questions and applied to a population of 700 respondents and the survey period was between 2 and 7 May 2022. The investigated population, the respondents, were students of the University of Petroșani at the bachelor and master studies. The results of this research will be presented by the authors in other papers.

The authors conclude that any academic vision for the future development of HEI must take into account this new context of hybrid education, and also the options of teachers and students of that university.

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COVID-19 APPROACHES ON CORPORATE SOCIAL RESPONSIBILITY

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Abstract

Purpose - The purpose of this research is to identify how Romanian organizations have implemented corporate social responsibility models by examining employees' perceptions of the relationship between management behavior and actions and employee morale.

Methodology/approach – Qualitative research based on case studies with used semi-structured interviews. The study contains data from 10 respondents from 7 companies and compiles enough information to understand the investigated phenomenon.

Findings - The labor market impediments created by the Covid-19 pandemic, requires the update of the company's policies for permanent or remote employees, flexible employees and / or mixed location, but also for new employees.

Research limitations/implications - the impossibility of extrapolating the results to the entire researched population. One of the limits of qualitative research is that only SMEs from Bucharest, Brașov, Cluj, Galați, Prahova are considered. Thus, the results are relatively particular and difficult to generalize.

Practical implications - Most respondents agree that human resource management is one of the internal dimensions of corporate social responsibility.

Originality/value - The contribution of this study is remarkable, as it explores the impact of the pandemic on the staff recruitment and selection process, but also on employee retention.

Key words - CSR, talent management, post-pandemic actions

Introduction

In recent years, corporate social responsibility has become an increasingly hot topic in the academic community because of business activities on employees, customers, authorities, society, business partners, investors, the environment, and local communities. In this regard, a growing number of companies are pursuing, through sustained efforts, the inclusion of corporate social responsibility practices in their business strategies.

Literature review

Howard Bowen, also considered the father of corporate social responsibility, put forward practically the first definition of corporate social responsibility: “the obligations of businesspeople to follow those policies, to make those decisions, or to follow those directions that are agreed in terms of values and objectives by our society” (Bowen, 1953).

In 2011, with the publication of the new European Strategy 2011-2014 on Corporate Social Responsibility, the European Commission published a new definition: "the responsibility of companies for the impact they have on society" (European Commission, 2011).

The following reasons appear to be the main reasons why companies choose to implement corporate social responsibility activities:

- environmental issues (Murphy & Bendell, 1997);

- increasing the expectations of customers and employees, legislation and pressures exerted by state authorities, investor's interest in social criteria and changing purchasing practices of economic agents (Bögel, 2015);
- strategic or even defensive, altruistic or public-oriented motives (Vogel, 2005);
- "civil regulations", social responsibility - "the tribute that capitalism pays, everywhere, for virtue" (Vogel, 2005);
- improving conditions; inducing economic growth by leading the company in such a way as to respect the environment, human rights; obtaining a competitive position; a high degree of employee morality or a better reputation; redirection of discretionary resources; profitability (Vogel, 2005);
- the fiscal benefits, the increase of the company's visibility, the consumers' preference for the products of the socially responsible companies, the increase of the internal cohesion of the team involved in the development of the project within the respective company, etc. (Vogel, 2005);
- creating value, thus gaining legitimacy, maintaining its status and maximizing its long-term economic efficiency (Vogel, 2005);
- altruism, this being the first reason why social responsibility appeared in America around the 1980s (Bueble, 2008);
- compliance with the law, ethical conduct, as well as the adoption of a responsible behavior that proves that there is that social consciousness characteristic of the corporate citizen (Kotler & Keller, 2008);

CSR practices improve the standard of living of society (Jamali, 2008), contribute to economic development (Chapple & Moon, 2005), address social and environmental issues such as human rights, environmental pollution and environmental problems and the workplace that employees struggle with (Dumitrescu, Simionescu, & Roman, 2015). Some gaps in research on the implementation of CSR practices have been identified in the literature (Dumitrescu & Simionescu, 2014). Thus, the various CSR practices that include the culture and traditional customs of developed countries are not applicable in developing countries such as Romania.

Following a study conducted in 2012 by a group of Romanian researchers, the following conclusions were reached: first, the vast majority of company managers did not understand what it means to be a socially responsible company, which is why I do not even agree with most of the definitions given to corporate social responsibility; secondly, when asked to explain what social responsibility means, they were not able to make logical arguments; they argued that the involvement of companies in social responsibility activities has a purely economic motivation and that it is related to the size of the company, rather large companies integrating the implementation of CSR activities in its vision (Herman, Georgescu, & Georgescu, 2012).

Purpose of the study

The year 2020 was a transformational year. The pandemic has highlighted the ability as individuals, companies, governments to adapt and change. The unprecedented health crisis has led to the need to consider that social issues, such as employee safety and especially their well-being may be in the interest of the company, even in the absence of direct economic benefits, or costs.

Attracting and retaining creative people in the organization, able to make decisions and focus on problem solving, is one of the biggest challenges for company leaders today, so ensuring a positive work experience for employees is essential.

Business leaders around the world have learned valuable lessons as they have sacrificed short-term profit for long-term resilience, rapidly changing traditional strategies to ensure their current survival and future prosperity, but also to retain and train employees.

An employee's experience includes everything he encounters in his daily activities, observes, and feels within the company he belongs to, beyond his involvement in the role of employee and organizational culture. The last two years have managed to change the way companies perceive this experience, especially since it does not refer, as many companies considered, only to occasional bonuses or appreciations, but throughout the existence of an employee in the company - from attracting and recruitment, onboarding, development, and retention. Another characteristic of contemporary society is

the assumption that at work, in performing the daily tasks, each employee behaves in a conscious and responsible manner. Being a good citizen now means appreciating values, behaving responsibly and morally, helping to maintain a clean environment, and having decent interpersonal relationships, requirements that apply to companies, but also to their employees.

The purpose of this research is to identify how Romanian organizations have implemented corporate social responsibility models by examining employee's perceptions of the relationship between management behavior and actions and employee morale.

Methodology

The research is qualitative based on case studies in which we used semi-structured interviews to collect data from respondents. The study contains data from 10 respondents (managers and above positions) from 7 companies and compiles enough information to understand the investigated phenomenon.

Findings and results

The experience on management position of the 10 respondents (70% men and 30% women, aged 35-60 years, 40% with bachelor's degree and 60% with master's degree) differs from 1-2 years to over 20. From their answers we could see that they are involved not only in the core business, but also in that of subordinate employees, but even in other departments, supporting them, giving them suggestions, informing employees about the possibilities of updating their knowledge and skills, taking the initiative to discuss things if they have departmental or inter-departmental problems. Based on the interviews, we found, among other things, the labor market impediments created by the Covid-19 pandemic, which require to update the company's policies for permanent or remote employees, flexible employees and / or mixed location, but also for new employees.

Most respondents agree that human resource management is one of the internal dimensions of corporate social responsibility. They agree that corporate social responsibility must include measures of transparency and good information throughout the company, a sustainable and general balance between objectives or work tasks and personal and / or family needs, equal pay and career opportunities, active promotion of employees in a situation of inactivity due to permanent / temporary illnesses / disabilities, but also with the fact that the company must develop measures for employees by providing equal treatment, a sustainable and equitable structure.

A few actions that were taken during the pandemic by the management of the 7 companies, included:

1. Giving masks to employees (1 box with 50 pieces per month), disinfectants, gloves where necessary
2. Postponement of shift entry / exit hours
3. Visual training by displaying posters and banners
4. Disinfection action by nebulization
5. Telework (where applicable)
6. Online meetings and conferences
7. Giving a package of protective food once a month

Post-pandemic actions no. 5 to 7 are still maintained, and steps are taken to implement measures for new employees, namely: online orientation trainings and video information materials.

For all employees, the management is aware that they must hire the right person in the right role, which is a human resource priority. Thus, one goal is to prepare a multi-qualification matrix by cross-training people and exposing them to different parts of the business.

Also, for to streamline the processes and the revision of the company's structures, a system for evaluating the potential of the employees is being implemented, together with a succession plan from which are emerging the training needs. The potential is between a person's current abilities and possible future roles, considering the person's ability to grow and long-term derailments. Talent refers to the

natural ability to excel in debt or in performing an action. Talent management refers to a critical process that ensures the company the quantity and quality of people to meet current and future business priorities. Skills are observable and measurable characteristics of a person related to success in the workplace.

Succession plans help identify potential candidates for existing positions, considering the needs of the company and the objectives, competencies, and development potential of the candidates. Potential candidates could be approached in terms of their interest in succession possibilities. Stakeholders could then be developed for future roles and responsibilities and, where appropriate, could benefit from the opportunity to hold multiple management positions during periods of temporary absence of employees from those positions.

Most of the managers interviewed stated that another measure for employee loyalty and retention is the implementation of a system for rewarding suggestions for improvement and innovation.

Discussion and conclusions

The contribution of this study is remarkable, as it explores the impact of the pandemic on the staff recruitment and selection process, but also on employee retention.

We have made some suggestions for adapting to the new changes for effective work:

- The psycho-emotional health of employees, a priority through the implementation of a culture of hygiene and integrated health.
- Hiring Romanian citizens: attracting and supporting talents by creating conditions for inclusion and integration, meaning processes and tools for a digital onboarding to face the permanent challenges of being able to retain valuable employees in the company.
- Adaptation to technological needs, imposed by remote and hybrid work - by constantly adapting to legal requirements, this process also comes with a planning of investments in high-performance IT equipment and services.

Talent management is also quite new to Romanian HR practices. Its purpose is to determine the necessary competence for the personnel carrying out activities that influence the compliance with the requirements regarding the product / environment / OHS performance by evaluating the effectiveness of the actions undertaken and to set the methodology for identifying training needs to ensure that personnel performing activities that influence product quality are adequate based on appropriate education, training and / or experience, as required.

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THE INFLUENCE OF CORPORATE SOCIAL RESPONSIBILITY ON HUMAN RESOURCES - CAREER FORMATION

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Abstract

Purpose - “the social responsibility” of the organization must include measures such as: stimulating the lifelong learning process, meaning “lifelong learning”, giving decision-making responsibility to employees (delegation and participatory management), transparency and good information throughout the organization, a sustainable and general balance between work objectives or tasks and personal and / or family needs etc.

Methodology/approach – online questionnaire used to collect the data, which allowed the analysis and explanation of the causal relationships between the variables.

Findings - corporate social responsibility must include measures of transparency and good information throughout the company, a sustainable and general balance between objectives or work tasks but also measures for employees by providing equal treatment, a sustainable and equitable structure.

Research limitations/implications - Romanian employees' interest in corporate social responsibility reports, their perception of the reasons for companies' involvement in such activities

Practical implications - real support in making managerial decisions, thus bringing a series of contributions to the CSR activity of companies

Originality/value - no Romanian research has been conducted to bring in the way employees perceive the CSR activities carried out and communicated by companies

Key words - CSR,

Introduction

Corporate social responsibility (CSR) has become a mass issue, gaining the status of corporate priority for the management and for the marketing of a company. The concept of CSR enjoys a not very long but varied history since more and more organizations are beginning to realize that they can contribute to a sustainable development if they conduct their operations in such a way as to achieve economic growth and competitiveness while ensuring environmental protection and promoting social responsibility, including the protection of consumer interests.

Literature review

Corporate social responsibility is a concept that has been given a lot of attention, especially in recent years, both in the literature, by reflecting it in countless scientific studies and in practice, by including it frequently in the organizational strategies and policies (Amujo et. al., 2012).

Despite numerous efforts to draft a clear and unambiguous definition of the concept, there is still some confusion, both among theorists and practitioners, as to how the social responsibility of organizations should be defined (Brown&Deegan, 1998), (Falck&Heblich, 2007), (Mohr&Webb, 2005).

This situation can be explained in terms of at least three essential aspects. First, the concept in question is very broad and complex, including a wide range of elements of a socio-economic or ecological nature, and respectively, referring to various groups of stakeholders (investors, customers, employees, suppliers, distributors, community, public authorities etc.). Second, the diversification and even abundance of definitions of social responsibility of organizations is due to the often subjective and biased

manner, determined by certain specific interests, through which those involved approach the concept and define it. Last but not least, "corporate social responsibility is in itself a dynamic phenomenon, whose meanings evolve over time and adapt to the new expectations of society." (Carrol, 1999)

The public, civil society are convinced that it is no longer enough for an organization to claim that "its only concern is to make profits for shareholders, as long as they are based on operations that fundamentally affect - negatively or positively - the lives of companies in which operates" (Ilieş, 2012)

More and more organizations are beginning to realize that they can contribute to sustainable development if they conduct their operations in such a way as to achieve economic growth and competitiveness while ensuring environmental protection and promoting social responsibility, including the protection of consumer interests. The key terms that materialize the model of social responsibility of the organization differ from one sector to another, and from organization to organization, but a generic model of corporate social responsibility include the following directions: human rights; working conditions in the supply chain, but also within the organization; the environmental impact of operations, processes, services and / or products; the impact on local communities of operations, processes, services and / or products, the impact on customers of operations, processes, services and / or products; investment responsibility) (Iamandi, 2010).

Purpose of the study

For many modern companies, a major challenge is attracting and retaining highly qualified employees. In this context, "the social responsibility" of the organization must include measures such as: stimulating the lifelong learning process, meaning "lifelong learning", giving decision-making responsibility to employees (delegation and participatory management), transparency and good information throughout the organization, a sustainable and general balance between work objectives or tasks and personal and / or family needs etc. Starting from the idea that in Romania no research has been conducted to bring in the way employees perceive the CSR activities carried out and communicated by companies, we transform this issue for the purpose of this research, extending it to research the influence of corporate social responsibility on career formation.

Characteristic of contemporary society is the assumption that at work, in performing tasks, each employee behaves in a conscious and responsible manner. Being a good citizen now means appreciating values, behaving responsibly and morally, helping to maintain a clean environment, and having decent interpersonal relationships, requirements that apply to companies, but also to their employees.

It is important to know within an organization / company how satisfied / dissatisfied the employees are, because if an employee is satisfied it means that he is: more motivated and easier to get involved in new projects, he has fewer absences due to illness or for other reasons, he is more loyal, less inclined to leave the company, indispensable in difficult times, he is more productive, more responsible for a good working atmosphere. While a dissatisfied employee is less motivated, has a poor professional performance, has many absences due to illness, does not perform his tasks, affects team spirit, does not communicate very well.

My research considers employees' perceptions of the influence of social responsibility in career formation. We drafted a research model of corporate social responsibility, whereby correlating with the internal and external dimensions and actions of corporate social responsibility we identified the fact that there are several ways to determine the perception of company employees. Thus, managers can choose between direct conversations with employees, group discussions or questionnaires depending on the organizational culture of the company, structure, organization and even the atmosphere at work.

Another objective of the present study is to identify factors influencing the response of social responsibility in career formation. Employees have the right for the company they work for to show them the impact of their social responsibility activities, because only if they see how important and significant the company's CSR strategies are, employees can become more satisfied, more devoted to it, fact which also emerges from the research model of corporate social responsibility.

Methodology and sample data

The experimental data were subjected to processing, using the hypothetical-deductive theoretical method for interpreting, and explaining the results, as well as methods of quantitative and qualitative interpretation with differentiation of characteristics for distinct experimental groups.

We have chosen this method of collecting data in this research, namely the combination of qualitative and quantitative because this offers a high degree of validity and credibility to the research results, while allowing the exploration of the research topic from several perspectives.

The online questionnaire was used to collect the data, which allowed the analysis and explanation of the causal relationships between the variables. A modern method of applying the questionnaire was used, namely its online design and application, using the Google Forms application, and the final data were processed using the Excel 2019 program.

The sample considered in this research is represented by people between 18 and 45 years old who are in career training, domiciled in Romania in 2022, and who are internet users (thus being able to access the questionnaire in this case). I received 25 valid questionnaires applied, which allowed me to verify the validity of the questionnaires by statistical techniques.

Following the analysis of the level of education of the respondents shows that the majority (48%) of the respondents have a bachelor's degree, while 32% of them have secondary education. Only 12% of respondents have master's degrees and 8% have doctoral studies. Considering the age, 48% of the respondents are between 18 and 25 years old, 40% are between 26 and 35 years old and 12% are over 35 years old. We had 60% male respondents and 40% female respondents. In terms of the field of activity of the companies 24% are companies in the field of trade / retail, 20% services, 12% education, 12% banking / financial services, 12% IT / Telecom, 8% transport, 4% tourism, 4% agricultural, 4% legal.

Most respondents (46%) work in large companies (51-250 employees), followed by those who work in medium-sized companies (26 - 50 employees) in proportion of 23%, 15% work in a multinational company, 12 % in small companies (11 0 25 employees) and only 4% work in a micro-enterprise (maximum 10 employees). Most of the 25 respondents (84%) claim they work in companies that have implemented CSR activities, while 12% say that in their companies no CSR activities are performed and 1 (4%) does not have knowledge of the existence of such CSR activities.

Findings and results

Most respondents agree that human resources management represents one of the internal dimensions of corporate social responsibility. So most of the respondents agree with the fact that the social responsibility of the company must include measures regarding transparency and good information at each level of the whole company, a sustainable and general balance between objectives or work tasks and personal and/or family needs, payments and opportunities of equal career opportunities, the active promotion of employees in a situation of inactivity due to permanent/temporary illnesses/disabilities, but also with the fact that the company must present a model for employees by granting equal treatment, a sustainable and fair structure.

According to the respondents the management of the impact on the environment and natural resources is one of the internal dimensions of corporate social responsibility, which is based on the following logical connection: reducing the consumption of resources and reducing polluting emissions and waste can reduce the impact on the environment. Most respondents agreed that the sustainable development (items q21 – q22) represents a process that has identified complex community problems such as the incorrect use of natural resources. Corporate social responsibility being seen from this point of view as a potential solution for solving gender issues by integrating it into the organization's business strategy. Globalization (items q23 – q24), according to respondents' statements, also represents one of the CSR actions, for CSR plays a vital role in detecting the impact that globally expanded businesses have on the workforce, on the local community and its economy (see figure no. 1).

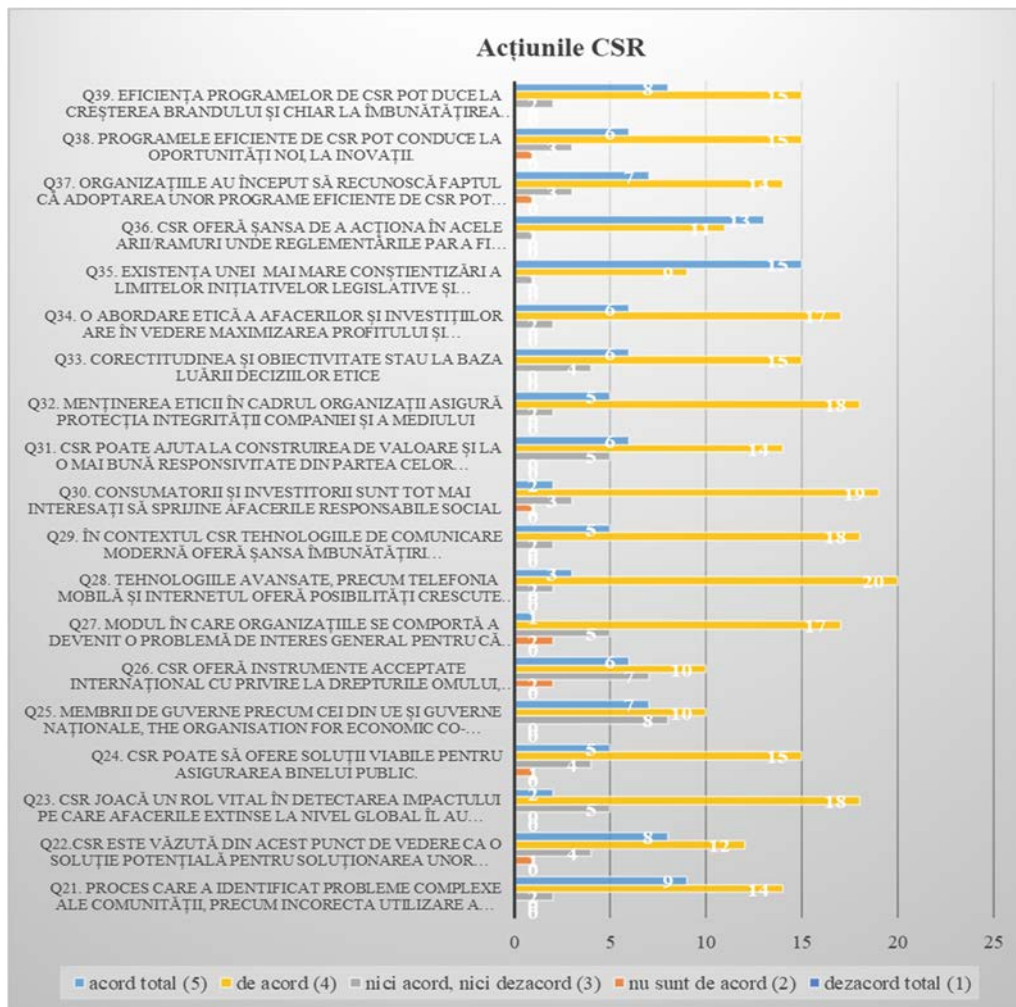


Figure no. 1 – CSR Actions

Corporate social responsibility can provide viable solutions to ensure the public good. Regarding governance (items q25 – q26), respondents agreed with the statement that CSR provides internationally accepted tools regarding human rights, the environment and anti-corruption. Most respondents stated that the actions of the corporate sector (q27) represent a CSR action due to the way companies behave, which has become an issue of general interest because their influence on the political, social, and environmental systems is increasing. According to the agreement of most respondents, information and communication technology offers increased possibilities for internal and/or external communication for any company, and in the context of CSR, information and communication technologies offer the chance to improve strategic partnerships and social dialogue. Regarding another CSR action, namely financial capital (items q30 – q31), most respondents stated that they agree/strongly agree with the statement that CSR can help build value and better responsiveness from the part of those interested in the business. According to most respondents, the ethical actions (items q32 – q34) represent a CSR action, because an approach to CSR from this point of view can lead to the improvement of the company's relationship with the interested groups, to greater transparency and to ethical standards raised. Leadership (items q35 – q36), represents another action of CSR, and according to respondents' opinions, CSR offers the chance to act in those areas where provisions seem unlikely. The last CSR action is represented by the business tools (items q37 – q39), which according to the answers received from the respondents, with the adoption of some effective social responsibility programs, they can reduce the risk of business division, and can lead to new opportunities, innovations, brand growth and even improving work efficiency.

Regarding the research on CSR awareness among company employees (figure no. 2), most respondents agreed with the following: in the adoption of CSR strategies, the HR department plays an important role (14), employees can manage the implementation of CSR strategies (12), employees can

proactively monitor the adoption of CSR strategies while documenting its success throughout the company (18), CSR has a high effect on attracting, motivating and/or retaining an employee (15), certain employees work for a socially responsible company, because it can offer them opportunities for promotion, professional development (10), employees are inspired to work more, to be more productive, when they work for a socially responsible company (10). We can see from figure no. 3, that even if there were respondents who did not agree, or who did not want to express themselves (neither agreement nor disagreement), the majority agreed/totally agreed with the statements regarding how employees perceive the influence of CSR in career training, so most agreed with statements such as: the existence and compliance of the internal order regulation by employees (18), transparency in a company must be manifested by honesty towards employees (18), employees they must be informed in a fair and coherent way regarding the CSR strategies undertaken by the company (15), etc.

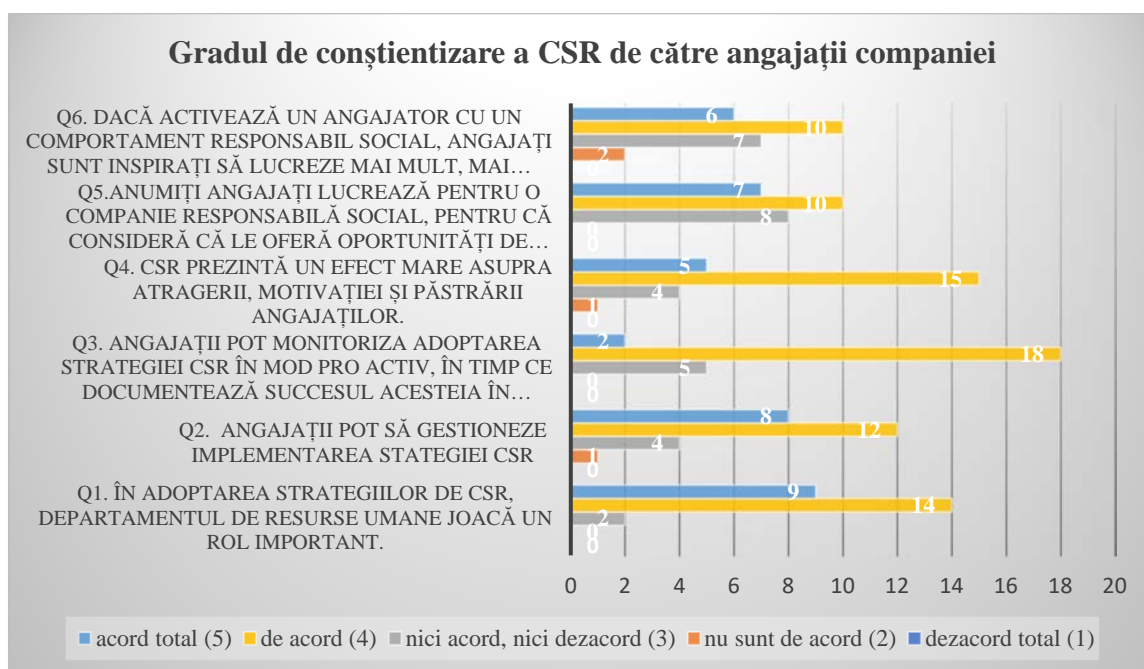


Figure no. 2 - Awareness of CSR by the company's employees

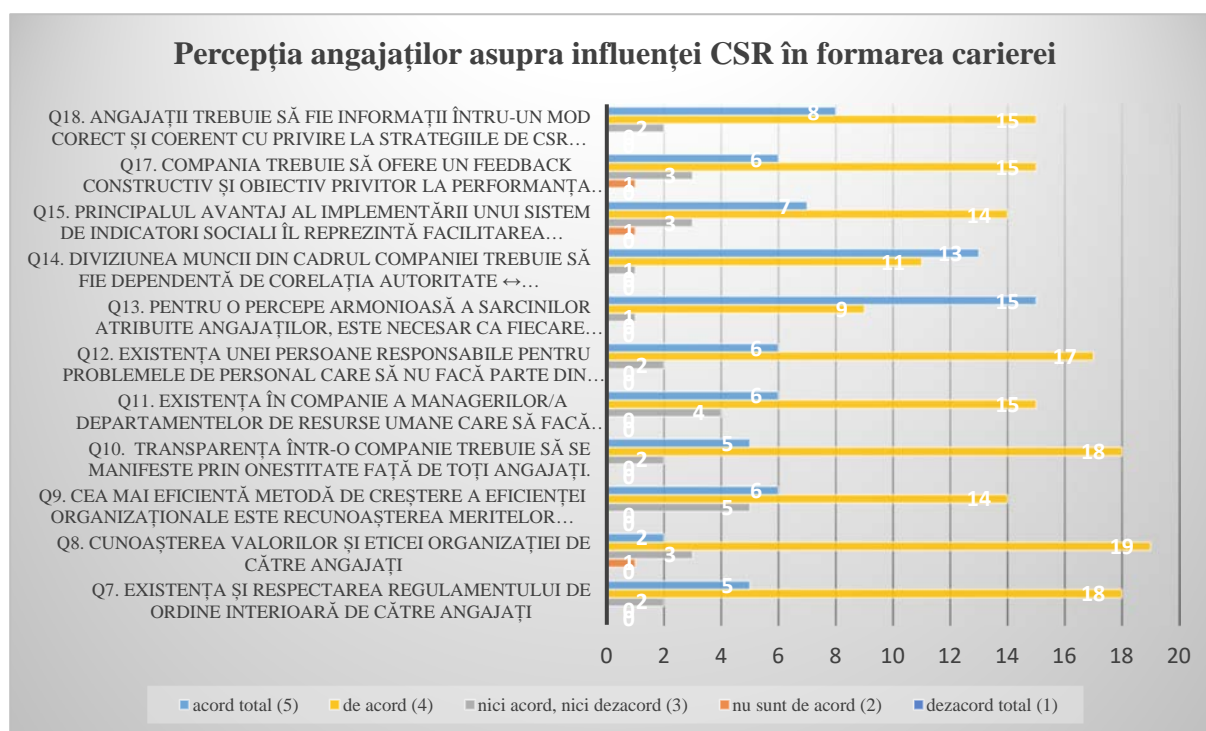


Figure no. 3 - Employees' perception of the influence of CSR in career formation

Discussion and conclusions

The research aimed to determine employees' perceptions regarding the activities and policies of corporate social responsibility implemented by companies, and their influence in career formation, by identifying employees' expectations in this regard, the way they perceive the components of CSR, by identifying the degree of involvement and the influence of CSR on career formation.

From a practical point of view, the results obtained in this research can provide real support in managerial decision-making, thus bringing a series of contributions for the CSR activity of companies. So, for example, it could help company managers to find the necessary justification to invest in the development of CSR strategies, investments that can create, in the long term, effects both on the company, but also on the employees, such as trust, satisfaction, loyalty, high degree of productivity, devotion to the company.

At the same time, it can offer company managers a starting point in the form of an answer to the questions: CSR represents a cost for the company or a long-term investment and what are the expectations and how employees perceive the CSR activities that the company wants to implement.

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APPROACH ON THE LONG TERM IMPACT OF THE COBOTS IMPLEMENTATION

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Abstract

Purpose – The purpose of the research presented in this paper is to identify some aspects of the acceptance dimension for Cobots used in nursing area.

Methodology/approach - Through a survey within two EU member countries, we compare the attitude of German and Romanian participants in using and accepting Cobots in nursing areas.

Findings – The results of the survey show that most participants are in general open to this technology.

Research limitations/implications – It was not possible to allow participants to have direct contact with Cobots before the survey began. Therefore, at the beginning of the survey, Cobots and Nursing Bots have been described as accurately as possible.

Practical implications – The aim of this research is to identify and represent the degree of appreciation and use of the Cobots, focused on the clinical (medical and nursing) applications. Especially, since the pandemic situation has exposed one weakness of healthcare systems, i.e. the shortage of personnel.

Originality/value – The results confirm, that the user is in general ready and that the Cobot market is set to grow from a global valuation of 475 million USD in 2020 to 600 million USD in 2021 and to a substantially 8 billion USD in 2030, considering a projected CAGR of 32.5%. (Allied Business Intelligence - ABI Research, 2021)

Key words: Cobots, Nursing, Survey

INTRODUCTION

Cobots are the synergic result of different trends that after a long period of developments achieved the necessary technological level to be promoted on the global market, including the smart sustainable manufacturing.

The industrial revolution I4.0 arrived with large political pressure on the manufacturing digitalization. Technologically the I4.0 is accompanied by new challenges in developing new sensor families and sensoria facilities, high-speed communication systems, larger access to databases and iCloud together with new managerial technologies. In this context the manufacturing robotisation started in 1960 may be applied in a totally different manner, and in totally different other domains of activities, rising organisational challenges due to the economy globalisation, population ageing, a higher demand of skilled professionals in the middle of the personnel crises in heavy work, medical and social assistance.

On this background it appears that the possibility of using Cyber-physical approaches and the Cobots as skilled, demanded and tireless workers are finding themselves in a market that needs them.

In this paper, as part of a larger research including also PhD work, the focus is on the Cobots usage within the clinical environment, considering a parallel survey within two EU member countries, Germany and Romania, and some other countries collateral data.

What is mainly compared is the attitude of German and Romanian population participants in using and accepting the application of the Cobots in clinical areas, especially for nursing activities.

The current pandemic situation – together with many kind of economic, politic and social pressure determined by the demographic evolution, the skilled workers ageing and even extinction and the changes imposed by the large and forced migration - has exposed the healthcare systems within the EU countries, one weakness of the system more than other, i.e. the shortage of personnel.

One major aim of the larger developed research is to extend the findings to a PEST analysis and help Cobots manufacturers, distributors and integrators to improve their technological and economical capacities by a better market understanding, and by becoming more profitable and with a better awareness of potential risks. It is considered that this approach will contribute to the promotion of the evolution and implementation of the Cobots by also increasing the capacity to generate long term scenarios for the Cobots lifecycle, in accordance with a specific market, forecasting their impact within a generally considered unpredictable market due to the no history and the unicity of the applications.

Within the research was considered the perspectives - opportunities and risks - from two representative countries to assure a broader perception regarding the PEST factors. One is in the middle of EU, with a technological leading economy, pretty aging population and face millions of input migrants; the other one at the far east end of EU, anon Schengen country, with an emerging market economy, strongly related (as follower) of the German economy, moderate aging population, facing with little input migrants but millions of output migrants from the active population.

As is described, based on the depicted profile of the two EU countries, it is expect to encounter different attitudes and expectations from the two type of participants having also the scaling factor in the dimension of the two populations as 4.5:1 in favour of Germany. Considering also the strong profile of the two countries, the very occidental one and a former east country, we may consider them that are bracketing EU in assumption that the findings may be extended to further markets, different digital devices and enhanced Cobots manufacturing, as long as the results are of outmost importance for the Cobots manufacturers in order to adapt their products and technologies for the client satisfaction and the market absorption capacity.

PANDEMIC CLINICAL APPROACH

In the pandemic situation, one of the main challenges was to be able to treat the critical patients in the Critical Care Units (CCU), Intensive Care Units (ICU) and Intensive Treatment Units (ITU). The necessity to protect the already insufficient, exhausted and very exposed medical personnel rose the idea to introduce robotic systems as handing help. The classical problem of the robotic systems is that they must be isolated from the human subjects and take all the necessary security measures if any human is identified entering in the robotic operational space. In the clinical environment, the robotic system must interfere with patients and medical personnel and therefore the idea to adapt Cobots used in the industrial environment to clinical applications sounds very logical.

The major handicap or impairment that promotes humans instead of robots is the manual dexterity, the incredible ability of humans to use hands in a very accurate coordinate and skilful capacity to grasp, handle and manipulate objects in large and small movements.

Therefore one of the first integrators concern was to select the available robotic system that enables an adequate locomotion and positioning (mobility), ensure a slower but quick enough arm motion with collision control with no harmful or dangerous acts (soft touch), creating in the end the required gripping system. As the integrators final target the envisaged grippers must first be able to grip and handle a variety of object sizes with an adjusted gripping force enabling the handling of delicate, brittle or heavy objects, and if necessary to possess customized “fingers”.

Working in direct connection with the medical doctors and applying the exploratory research methodology from the engineering and management point of view the experts opinion was valorised in the elaboration of an internal list that describes the identified 12 clinical staff necessities in operating robotic systems (Table 1) and 14 technical characteristics list that enables the comparison between different robotic models and the compatibility with the medical staff desires. The lists may be enriched once gathered more experience.

Table 1. Clinical staff demands

Device	Software	Operation
Simple installation	Simple programing	Integrated control board
Plug and Play on the clinical IT platform	Adjustable gripping force	Ergonomic actuation
Flexible and wide work range	Enhanced position, speed and force feedback	Mechanical keys to double the touch screen ones
Tool output extension	Upgrade on request	File safe operation

Evaluation of the survey

In this article, we want to examine the social dimension from PEST readiness of potential patients to the use nursing bots in hospitals. The comparison between Romania and Germany should provide additional information about possible reasons for a positive or negative acceptance of Cobots. The survey was conducted between August 8th 2021 and September 11th 2021 using the platform surveymonkey.com. The authors asked for participation in their social networks. Emphasis was placed on the shortest possible completion time; in fact, this averaged 3:16 minutes. The dropout rate was 0%. 61.65% of the participants were men and 38.35% women. When asked about their income, compared to the average income of each respondent country, 47.32% of the participants stated to be below average, 17.56% have an average income, 25.37% have an above average income and 9.76% did not desire to specify. An important observation is that already more than 1/3, 35.92% of the participants, had their first experience with robots. The majority (57.28%) had not yet gained any experience with robots, but seems that are aware about the topic.

General result

"Nursing robots? Such nonsense"

This quote is from Ricardo Lange, an intensive care nurse. In an interview with Katrin Göring-Eckert, a member of the Bundestag, he stated, that he can't imagine how Nursing Bots can help in the ICU. She opposed, that Nursing Bots are something to think about. Where they can be used and where not. However, she also thinks, that Nursing Bots are a bit of a pipe dream. ("Wertschätzungsmäßig Ist Das Unterste Schublade")

Lange is an advocate for caregivers in Germany. He knows the daily routine in hospitals and cannot see any great benefit in Cobots. Göring-Eckert, on the other hand, as a professional politician, recognizes Germany's current and future situation, with too few nursing staff, and thinks about possible solutions.

However, how do potential patients see it? To investigate the possible acceptance among potential patients, we hypothesize the following: Patients are generally ready for the use of Nursing Bots.

The answers of the Romanian and German participants differ with regard to the basic attitude towards Nursing Bots. Overall, 93% of the Romanian participants and 77% of the German participants consider the use of Nursing Bots to be useful in principle. In the assessment of the benefits of Nursing Bots (1 would be not useful but dangerous and 10 would be very useful), the average values are 8.05 for Romanian participants and 6.55 for German participants. It can therefore be stated that, in accordance with the authors' expectations, Romanian participants are generally more open to Nursing Bots. The final question as to whether a human specialist is preferred over Nursing Bots also confirms this picture. Here the rate was 53% for Romanian participants compared to 68%.

Usefulness in general

We asked on a scale of 1-10, how useful in general the survey participants would rate the use of Nursing Bots in everyday hospital life. The average grading of 7.09 shows that the overall acceptance is high.

Preference in general

Nevertheless, when asked to prefer a human caregiver/caretaker or a Nursing Bot, 63.11% stated, that they would prefer the nurse. 24.76% was not sure and only 12.14% chose the option Nursing Bot. Even if Cobots are seen as useful, a human nurse is preferred if to choose between both.

Non-body touching services

- For 93.63% it would be ok if a Nursing Bot cleans their room in the hospital.
- 81.37% would be ok with a Nursing Bot removing the dishes in their room after dinner.
- 73.53% would accept a Nursing Bot serve the meals into their room.
- 63.73% stated that it would be ok for them to encounter a Nursing bots on every hospital corridor.

It can be stated that non-body touching services by Nursing Bots are accepted in general.

Body-related services

When it comes to body-related services, 96.94% would accept a Nursing Bot assisting a human nurse. In turn, 23.47% would be ok with if the Nursing Bot is not assisting a human or is not being assisted by a human nurse.

When they could choose between the Nursing Staff and the Nursing Bot, the participants answered as followed:

- When performing the daily hygiene, 57.43% prefer a human nurse.
- When being fed, 52.97% again were in favour of a human nurse.
- When being moistened or creamed over the entire body, again 52.97% chose the human nurse.
- 51.98% would prefer a Nursing Bot when it comes to preparation and administration of their medication plan, but in 4 cases the percentage is pretty close to 50%.
- When injecting medication, i.e. insulin, 68.81% prefer a human.
- Interestingly, compared to an injection, when setting an infusion, the percentage that prefers a human nurse, drops to 64.85%.

General readiness

It can be concluded, that in general the participants are ready for Nursing Bots in action. However, when it comes to body-related services, the openness towards Nursing Bots is shrinking.

Attitude of German and Romanian participants

When looking at Hofstede Insights, the dimension Uncertainty Avoidance in Romania is quite high with 90. That would mean that Romanians are not open for new technology. Germany's value is at 65, which would mean that Germans are more open in comparison to new technology and therefore more open towards Nursing Bots in action. (Hofstede Insights, 2021)

Contradictory to Hofstede's Insights, the author's expectations are a bit different. Especially, due to the fact that the author's social network in Romania is focused on the area around Cluj-Napoca, which is a technologically very advanced and flourishing region.

To find out if there is a difference in preferences between the two EU members, the following hypothesis is to be validated or falsified. German and Romanian participants have a very similar attitude towards Nursing Bots.

Usefulness in general in comparison

The survey participants were asked, "On a scale of 1-10, how useful do you rate the use of nursing bots in everyday hospital life?". 1 would be not useful but dangerous and 10 would be very useful.

Romanians estimated the possible usefulness higher. Especially Romanian females would find Nursing Bots very useful. In comparison, German females rated the usefulness with only 6.23.

Table 2. German and Romanian opinion on usefulness

	Germany		Romania	
Usefulness	6.74		8.02	
	male	female	male	female
Usefulness	6.95	6.32	7.96	8.07

Attitude of participants

The hypothesis, that German and Romanian patients have a very similar attitude towards Nursing Bots has been falsified among our participants. The impact of living in an area that has a big proportion of young people together with the tech companies operating in the same region around Cluj-Napoca might have a bigger impact on openness towards new technologies.

Further data examination

In addition, we examined the data according to further criteria. The following tables provide a corresponding overview.

Age, gender and preference

We asked the participants if they could imagine to seeing Nursing Bots in action in hospitals and if they would prefer human personnel to a Nursing Bot.

It can be said that men in Romania as well as in Germany can imagine the use of Nursing Bots regardless of their age. In fact, however, this percentage is higher among Romanian women than among German men. When it comes to the question of whether human professionals are preferred, it is generally true that this increases with age. Only Romanian men are an exception.

Table 3. Correlation between age, gender and preference

Country	Gender	Nursing Bots in action	Human preferred	Age	Nursing Bots in action	Human preferred
Romania	male	96%	56%	16-30	100%	64%
				30+	93%	50%
	female	90%	50%	16-30	91%	45%
				30+	88%	63%
Germany	male	80%	66%	16-30	79%	66%
				30+	85%	67%
	female	69%	71%	16-30	66%	66%
				30+	75%	81%

Income

When asked whether income has an impact (a personal assessment relative to the average income in the respective country was asked), no clear tendency can be identified. This might be explained by the fact that we assume many well-educated students among the low income participants.

Table 4. Correlation between income, gender and preference

Country	Gender	Nursing Bots in action	Human preferred	Income	Nursing Bots in action	Human preferred
Romania	male	96%	56%	low	100%	33%
				average	83%	67%
				high	100%	75%
	female	90%	50%	low	90%	60%
				average	100%	33%
				high	67%	67%
Germany	male	80%	66%	low	81%	56%
				average	70%	80%
				high	82%	74%
	female	68%	73%	low	76%	65%
				average	71%	86%
				high	80%	40%

Level of experience

The assumption that existing experience with robots could lead to greater openness towards nursing bots cannot be substantiated by the present survey either. For example, the picture among German women is exactly the opposite and experience tends to lead to a stronger preference for human professionals. But may explain higher values at the Romanian population due to direct experience and mass media advertising of the robotic application in the Covid hospitals for critical and common spaces sterilization, as imported robots ("The European Commission is donating disinfection robots to a number of hospitals in Romania - HotNews.Ro"; "EC representation in Romania"; Vasilache) and the one manufactured in Romania (MUV Smart), but also as medical assistant, the Grace robot made in Hong Kong. (Grace nurse)

Table 5. Correlation experience and preference

Country	Gender	Experience	Nursing Bots in action	Human preferred
Romania	male	yes	91%	55%
		no	100%	62%
	female	yes	100%	50%
		no	83%	61%
Germany	male	yes	80%	59%
		no	80%	75%
	female	yes	62%	85%
		no	71%	64%

Services

When asked about the use of Cobots, the respondents usually have very different possible uses in mind, which can lead to fundamental rejection or acceptance. The survey therefore asked specifically about individual services, distinguishing between services that are close to the body and those that are not.

In contrary to expectations, the acceptance of services that are not close to the body is not fundamentally higher than that of services that are close to the body. Also, the previously gained picture of a higher acceptance of Nursing Bots among Romanian participants can no longer be clearly verified.

In the case of **non-body-related services**, acceptance is highest for cleaning activities. However, around 20% of the respondents cannot imagine that robots are being used to bring food.

Table 6. Acceptance of Nursing Bots in non-body-related services

Country	Gender	Cleaning sickrooms	Cleaning dishes	Serving meals	Encounter in the corridor
Romania	male	96%	84%	84%	64%
	female	97%	67%	70%	40%
	total	96%	75%	76%	51%
Germany	male	94%	78%	74%	72%
	female	87%	91%	62%	60%
	total	92%	82%	70%	68%

In the case of closer **body-related services**, the big difference between assisted and unassisted services is immediately noticeable. Just under one fifth of the respondents can imagine being treated close to the body without additional supervision by a human. In contrast, the acceptance of a joint activity of human and COBOT is very high and is over 90% in both countries. Only 4% of German females would feel comfortable when a Cobot alone would nurse them.

Table 7. Acceptance of Nursing Bots in body-related services

Country	Gender	Total	Assisting	Unassisted
Romania	male	25	92%	40%
	female	30	93%	17%
	total	55	93%	27%
Germany	male	97	96%	28%
	female	45	82%	4%
	total	142	92%	20%

The next question was about a **basic preference between human and Nursing Bot**. It was asked in which situations the respondents would prefer a human. First of all, it is noticeable that the values are generally above 50%, i.e. the use of humans is generally preferred. However, the values are in a range that was rather surprisingly low for the authors. Interesting are the differences between the Romanian and German participants with regard to body care and body creaming. Here it seems to be clearly more important for the German participants to have themselves looked after by a person (61% and 58% respectively), while these values are only 40% each for the Romanian participants. Interestingly, the Romanian participants' values are higher than those of the German participants only for the preparation of the medication plan. For injections and infusions, the values are higher, as expected, but it is noticeable that especially German participants in the survey place great value on a human nurse here (80% and 73% respectively).

Table 8. Preference between human and Nursing Bot

Country	Gender	Daily hygiene	Support with meals	Body creaming	Prep Medical Plan	Give injection	Give infusion
Romania	male	40%	44%	48%	52%	60%	52%
	female	40%	47%	33%	50%	60%	57%
	total	40%	45%	40%	51%	60%	55%
Germany	male	59%	56%	60%	46%	68%	66%
	female	64%	53%	53%	44%	80%	73%
	total	61%	55%	58%	46%	72%	68%

CONCLUSIONS

The results of our survey initially confirmed our expectation that Romanian participants could be more positive about the use of Cobots than German participants.

Romanian participants seem to be more open towards the new technology.

When analysing concrete services, these differences were no longer so serious. It is particularly noticeable that German participants have the greatest difficulties with body-related services provided by Nursing Bots. It also seems that German participants generally have more confidence in classic computer processes, but are unsure about robot-like processes.

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CONSUMPTION AND PRODUCTION IN THE CIRCULAR ECONOMY: A SYSTEMATIC REVIEW OF KEY FINDINGS

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Abstract

Purpose – Based on the premise that shifting from a linear system of resource consumption to a circular model could play a critical role in paving the way for a sustainable future, this paper provides an analysis of the existing literature on the topic of consumption and production in the the circular economy.

Methodology/approach – Following the methodology of a systematic review, this paper analyzed a total of 59 papers related to the topic of consumption and production in the circular economy.

Findings – It was found that the core of circular consumption and production models is that all product or product-service systems in the closed-loop supply chain have the potential to be redesigned and used in the subsequent product life cycle, thus adding value to resources or materials.

Research limitations/implications – Understanding circular consumption and production can enable businesses to decouple their profit from their resource consumption so that they become resilient and sustainable. This review has limitations, primarily due to its qualitative study classification is inherently influenced by researcher bias.

Practical implications – These findings strengthen the importance of creating an environment that enables the relevant stakeholders of a community to work together in supply chains.

Originality/value – A new explanatory model is proposed that explains how communities can enable the circular economy.

Key words: circular economy, sustainability, resource efficiency.

1. Introduction

The dissonance between the finite amount of available resources and the seemingly infinite human needs has long been studied in the scientific literature. Modern societies and their embedded economic systems have proven incapable of dealing with natural resource scarcity in a satisfactory long-term manner. The disparity between resources and human desires is expected to widen as we anticipate significant changes in the near future (Scheel, Aguiñaga & Bello, 2020, Lakatos et al, 2020). These issues are not new, in fact, academics have long been aware of them and have linked them to the threat posed by climate change. The contemporary consumerism that predominantly characterizes production and consumption models in high-income countries does not seem to be an economic model capable of simultaneously addressing the increasing population and its anthropogenic load. As a result, shifting from the current, ecologically unsustainable patterns of consumption and production to new, more sustainable ones is seen as an essential development objective with broad implications. In this context, the circular economy has begun to gain momentum as a solution to these problems (Giampetro & Funtowicz, 2020).

The essential feature of circular economy consumption and production is that all goods must circulate in a closed system. Biological and/or technical nutrients used in the manufacture of goods are designed to either safely re-enter the biosphere or alternatively to recirculate in the system at highest level of quality possible without re-entering the biosphere (UNEP, 2006). As a result, the proposal for a circular economy of production and consumption includes a "closed loop economy" based on "redesign"

thinking. Murray and colleagues (2017) proposed that biomimetics—the use of natural system structure and function to inform industrial processes—optimizes sustainable production in the circular economy.

Despite empirical evidence (Rada, Cioca & Ionescu) that the circular economy can optimize resource use, no theoretical review has been conducted to integrate consumption and circular production in a comprehensive model. Only 19% of studies defining the circular economy, according to Kirchherr and colleagues' research from 2017, took consumption and production into account. Although business and consumer acceptance were mentioned as topic areas in Van Eijk's (2015) prior analysis, which focused on the causes and challenges to the circular economy, the outlook was fairly wide. Geissdoerfer (2017) also wrote a review that focused on the connection between sustainability and the circular economy but did not include any discussion of how things are manufactured and consumed.

Therefore, this paper aims to fill a gap in the literature by pursuing two main goals. The first one aims at highlighting key characteristics of circular consumption and production and incorporating them into a theoretical model. The second goal is to develop a new descriptive model that integrates the 10Rs principles (Reduce, Reuse, Recycle, Refuse, Rethink, Repair, Refurbish, Remanufacture, Repurpose, R-cover) to facilitate circular consumption and production in communities.

2. Methodology

A systematic review's purpose is to synthesize all empirical data on a specific topic that meet a set of pre-defined criteria in order to generate new knowledge or models. The essence of any theoretical review is to use a replicable methodology while trying to identify all studies that could meet the eligibility criteria in order to provide a concise presentation of the research question investigated. The literature research was conducted on the WoS search engine. The following types of works were excluded:

- Articles that do not present new ideas;
- Papers presented at conferences,
- Technical reports, and book chapters;
- Articles that do not define data sources or in which data collection is unclear;
- Articles that do not address consumption/production in the circular economy;
- Papers published before 2010.

The methodological approach applied in this paper is depicted in Figure 1. The final sample included 59 articles.

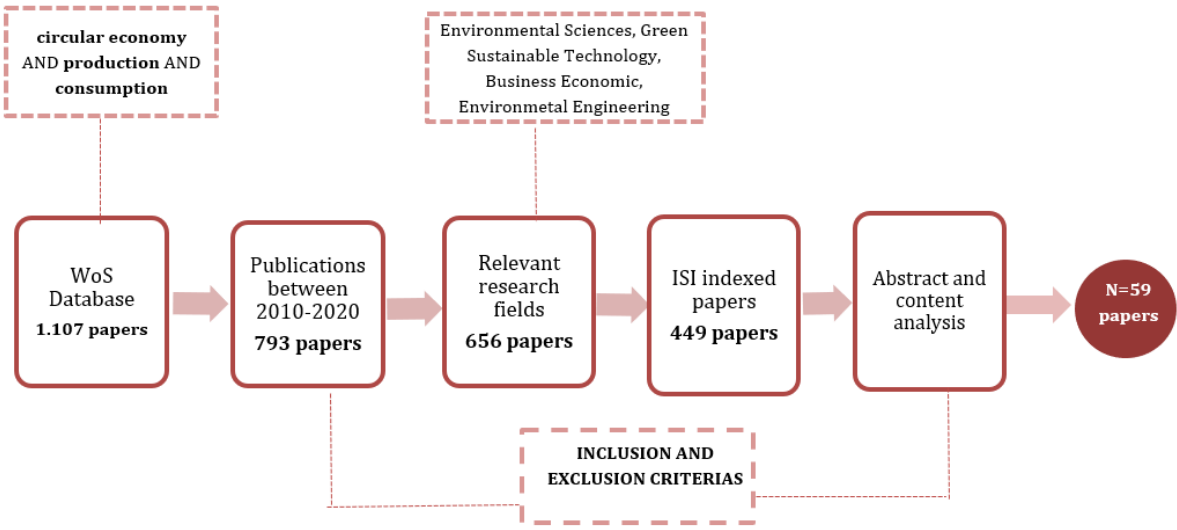


Figure 1. Methodological approach

3. Findings

The final sample was classified into conceptual papers, case studies and exploratory papers. Firstly, the conceptual paper showed us that circular consumption and production have no universally accepted definitions. However, a vast majority of the proposed models assume that all products and services systems in the supply chain can be redesigned and used as raw materials or resources in the next new product life cycle, thereby creating added value (Camacho-Otero, Boks & Pettersen, 2018). The case studies analysis allowed us to observe that although waste is considered a resource in circular production and consumption, not all waste can be recycled or reused, in part because of the infrastructure the physical and thermodynamic limitations. The environment's capacity to absorb trash from the economy is crucial, yet the majority of papers published so far either fail to take this limitation into account or do not address it effectively (Peng et al., 2019, Sehnem et al., 2019). Finally, from the exploratory studies, we found that there are untapped opportunities for economic growth through circular economy, beyond costs saving generated by recycling and reusing. According to the exploratory approaches, any new demand insertion in the circular flow of investment or consumption is expected to have a multiplier impact, resulting in increased investment (Wieser & Troger, 2018, Iacovidou et al., 2017).

Based on these findings, the model depicted in Figure 2 was created. Since no theoretical model identified in the sample of studies addressed the issue from this perspective, the model describes how circular consumption and production can be facilitated in communities using the 10R principles identified in Kircher's (2017) paper and the supporting mechanisms for implementing circularity presented in Yang, Zhou and Xu (2014).

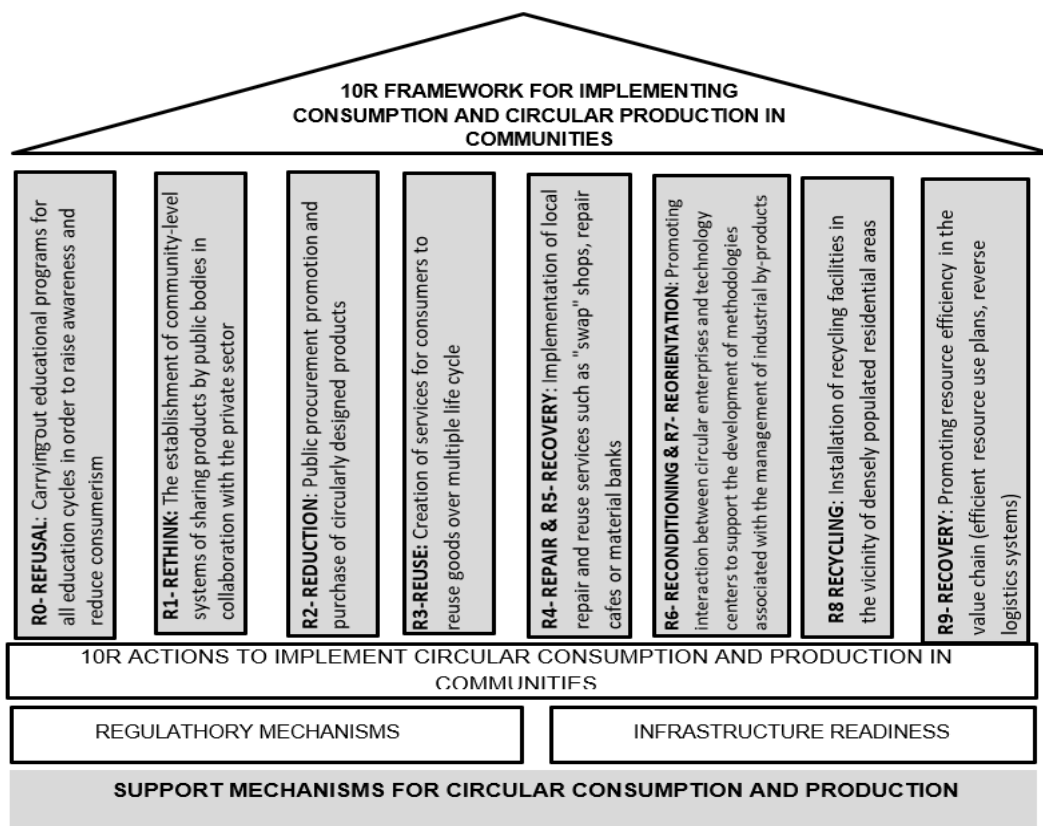


Figure 2. Proposed model for facilitating circular consumption and production in communities

The model also contains two main support means for the promotion of circular consumption and production. The assumption that infrastructure can facilitate the adoption of circular consumption and production is based on the idea that technological advancement and the circular economy are inherently linked. Even if the role of technology in micro-level initiatives (such as education or awareness campaigns) is less obvious, at the community level it becomes clear that technology is needed. For example, industrial symbiosis implies collaborative technological innovation for waste recovery. On the

other hand, regulatory mechanisms mostly involve national legislation and local decisions to support circular consumption and production. This concept also encompasses financing schemes for circular businesses, their accessibility, and the interactions with public authorities in terms of information exchange and financial regulation issues (Yang, Zhou & Xu, 2014, Păcurariu et al., 2021)

4. Research implications and limitations

From a practical standpoint, this paper highlights the importance of creating an environment that enables businesses and entities to work together in supply chains. For instance, the growth of clusters would enable these businesses to convert their unwanted externalities into materials that can be used by other organizations. The local institutions and governments supporting these businesses would benefit from the sustainable consumption and production of resources. In order to construct closed-loop systems, businesses can establish profitable partnerships with their suppliers, clients, and other stakeholders in a circular community (Ghisiellini et al., 2017). Nevertheless, particular industries are better suited to circular initiatives than others because recycling their resources is rather straightforward. For primary industries, such as iron, steel, and aluminum incentives to reduce waste in closed-loop systems may suffice. Secondary industries, such as solar and wind energy technologies or battery manufacturing, and biotechnological materials, will inevitably need to be reassessed in terms of recycling potential and life cycle performance (Cammilleri, 2017).

Moreover, the coronavirus revealed the fragility of the economic system, based on profit and continuous consumption of resources. Since this crisis has led to a reduction in commercial activity, the revival of economic activity requires the commitment of businesses to rely on economic recovery laws based on sustainability (Cifiuntes-Haura, 2022). Therefore, understanding circular consumption and production can enable businesses to decouple their profit from their resource consumption so that they become resilient and sustainable.

This review has limitations, primarily due to its qualitative nature. Despite the fact that the study selection process was documented to ensure replicability and transparency, study classification is inherently influenced by researcher bias. The inclusion and exclusion criteria were detailed in the paper to address this issue. Another consideration is the decision to examine only articles published in journals, which excludes the consideration of gray literature, which could make an important contribution to the review's objectives. Furthermore, there is a chance that the literature review we conducted overlooked several articles, that are relevant to the research. This limitation could be due to the way the database query was built, as we chose publications based on the literal use of the concepts circular economy, production, and consumption.

5. Conclusions

This systematic review provided an analysis of the existing literature on the topic of circular consumption and production. The core of circular consumption and production models is that all products or product-service systems in the closed-loop supply chain have the potential to be redesigned and used as raw materials or resources in the subsequent product life cycle, thus adding value to resources or materials (Yang, Zhou & Xu, 2014, Blomsma & Brennan, 2027). However, in order to further implement circular consumption and production, the coordination and cooperation of multiple closed-loop supply chain systems is essential, in order to optimize reuse and recycling potential and capture additional value by integrating all supply chain activities.

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THE ROLE OF PUBLIC AUTHORITIES IN THE TRANSITION TO A CIRCULAR ECONOMY

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Abstract

Purpose – To investigate the current state of circular economy and green public procurement implementation among public authorities.

Methodology/approach - We conducted descriptive and a regression analyse on a sample of 122 participants.

Findings – One of the most frequently perceived barrier to the implementation of the circular economy is the lack of people with expertise in the field, the lack of knowledge on circular economy and green public procurements.

Research limitations/implications – One limitation is that the sample size is insufficient to extrapolate to develop general assumptions on a larger scale.

Practical implications – These findings can further contribute to the elaboration of a conceptual framework for embedding circular economy within the public authorities.

Originality/value – Studying the importance of the public sector in the transition to a circular economy, highlighting the behaviors, barriers and facilitators in this transition.

Key words: Circular Economy, Green Public Procurement, Circular Cities

Introduction

Concerns about the scarcity of the earth's natural resources are growing rapidly in an ever-growing global economy, in the context of a world where resources are limited. Furthermore, resource extraction and use are both associated with pollutant emissions and waste generation, exacerbating the negative environmental impacts (Hashimoto, Fischer-Kowalski, Suh, and Bai, 2012). Today, there is no doubt that humanity is a major contributor to the environmental changes and instability that the Earth is experiencing (Rockström et al., 2009; Steffen, Crutzen, and McNeill, 2007). Much of these issues can be traced back to the long-standing linear economic regime, which has been characterized by the "take-make-dispose" paradigm, which has been identified as inherently unsustainable in the long term in the context of a resource-constrained world (Lieder and Rashid, 2016; Rice, 2007, Rada et al., 2017).

The circular economy (CE) paradigm is gaining popularity as a means of addressing current sustainability challenges and easing the transition away from the linear model of production and consumption. The public sector is essential because it is a significant buyer, consumer, and user of goods and services, but it is also an important decision-making factor and a model of good practises for others. Although, public sector and circular economy together has received very little attention in CE research (Klein et al., 2020).

The role of public authorities and how they can become key elements in this process is an important factor in facilitating the transition to a circular economy, and it is examined in this study. The public sector has a well-known influence across all other industries (Ball and Grubnic, 2007), mainly through the design of regulations and policies as well as establishing a broad direction for how organisations will implement circular economy principles, thus serving as a good practice model (Domingues et al., 2018;

Ranängen et al., 2018). Adaptation to CE is thus a means of survival for companies, including public authorities, if they want to meet society's demand for long-term sustainable practices (Birgovan et al., 2022).

According to the Ellen MacArthur Foundation (EMF), city governments play an important role in creating thriving, viable, and resilient cities that are regenerative by design. This key role is due to their proximity to the everyday concerns and needs of urban citizens and businesses, as well as the policy levers at their disposal. City governments frequently witness, experience, and manage the negative consequences of today's take-make-dispose linear economy, whether through public funds spent on solid waste management, structural waste costs such as the cost of underutilized buildings, economic costs due to congestion, or health costs due to air and noise pollution. Cities can help to catalyze broader system transformation. City governments have become more daring in driving such change in recent years (EMF, 2019).

City governments can engage, incentivize, manage, and establish a regulatory framework to create the conditions for the emergence of 21st-century cities. Cities can bring about changes in the use and management of materials within them by incorporating circular economy principles into urban policy levers; and urban priorities such as access to housing, mobility, and economic development can also be met in a way that supports prosperity, jobs, health, and communities. Cities, for example, can obtain products made from secondary raw materials or designed to be repairable and reusable. In this way, they can generate demand for circular innovations while also serving as a model for businesses and citizens to emulate.

Public procurement is the process by which the public - sector obtains works, goods, and services from businesses through the use of a public contract (Lozano and Witjes, 2016; 'Public Procurement - Growth - European Commission, n.d.). Construction, education, administration, transportation, office furniture, and other equipment are all included (Lozano and Witjes, 2016). Measuring cities' progress towards a circular economy also allows them to self-assess their achievements, identify barriers and opportunities, and adjust their development trajectory towards circularity as needed.

Thus, it is extremely important that we have a framework as realistic as possible to help the transition of cities to a circular economy. At the moment, there is no shared understanding of circular economy indicators in the literature or for the authorities that have decision-making power (Birgovan et al., 2022).

Traditional public procurement does not consider externalized environmental impact in its procurement process, instead focusing on product and service quality and the most cost-effective option. Given the large amount of money spent by government, public procurement has the market power to encourage the market penetration of circular products and services (Rizos, Behrens, Drabik, Rinaldi, and Tuokko, 2018). It can accomplish this by creating markets driven by public demand and promoting more sustainable business models by supporting national strategies, laws, and regulations that guide the procurement process at both the EU and national levels. Increased growth circular demand criteria at the national level. GPPs, for example, can promote resource-efficient products by advocating for increased product life, product design for ease of repair, refurbishment, disassembly, and recycling (Alhola et al., 2018).

The European Commission defined green public procurement (Green Public Procurement or GPP) in the Communication "Public procurement for an improved environment" as follows:

... "a process by which public authorities seek to purchase goods, services, and works that have a lower environmental impact throughout their life cycle when compared to other goods, services, and works that serve the same primary function."

2020 was an exceptional year, not only because of COVID-19, but also from the perspectives of research and policy relevant to Green Public Procurement. The EU Green Deal, which states that public authorities, including EU institutions, should lead by example and ensure that their purchases are green, has opened the door to new rules for Green Public Procurement over the last year. To ensure such progress, the Commission will propose new green public procurement legislation and guidelines (COM, 2020).

Modern consumption and growth patterns, characterized by high natural resource exploitation, rising emissions, and an extremely volatile economy, have led society down an extremely unsustainable path.

Indeed, resource depletion, increased pollution, and the rapid loss of biodiversity caused by the linear economic model have put the entire Earth system in jeopardy.

With these considerations in mind, we stopped for a moment at the city level to better comprehend the current situation in Romania regarding circular economy implementation and what is going on at the level of public institutions.

A study conducted in 2021 examined green public procurement in Romania, and the findings revealed that in our country, green procurement is not done frequently, and these factors are often overlooked (Bilan, 2021). The problem we address in the research is that there is no action at the level of public authorities in favor of the transition to a circular economy, and no green public procurement occurs, as required by the legal framework. As a result, the purpose of this study is to assist researchers in understanding why this is happening.

The current economic crisis is being blamed on the COVID-19 outbreak, which is the result of a breakdown in the global supply chain. In this regard, the pandemic has revealed the worst flaws of businesses and consumers, as well as their vulnerability to risk situations. Despite this, it has become clear that environmental sustainability is the way to face a situation of risk and uncertainty, which the supply chain faces; however, the economy faces an economic system of linear production, which presents a real challenge to achieve environmental sustainability, because resources are not used efficiently, and too much waste is generated. The public sector has a significant impact on today's and future societies. The public sector was chosen due to its critical role in societal change, and the way the circular economy is perceived and described in this field will have an influence on its smooth integration.

Methodology

The research design is cross-sectional and the data for all variables in the study were collected at the same time interval. A total of 122 questionnaires from representatives of public authorities from all Romania were collected via E-survey platform. Therefore, each individual received a link to participate in this study. They have been told that they need to report to the institution they belong to when completing the scale.

The participants included in this study were 35,25% males and 64.75% females. The average age of the sample was 44,8, more than half of the sample has a master degree and they are from 26 counties in Romania. Furthermore, 51.64 percent are from rural areas, while 48.36 percent are from urban areas. Less than 20% are unfamiliar with the concept of circular economy, while more than 70% are more familiar with the concept of sustainability.

In addition to descriptive analysis we ran a simple linear regression to see if public authorities' knowledge of the circular economy explains their CE and green public procurement behaviors, and if familiarity with the national green public procurement framework influences circular economy implementation.

Results

We discovered several intriguing aspects of Romanian public administration and have some good starting points for future research. According to the findings of this study, in the descriptive analysis it turned out that half of our sample, more specifically 50.82% declared that they know and understand what the circular economy is. We also wanted to identify which behaviors take place in order to be able to explore in the future if there are specific reasons why a series of behaviors take place more often and others not at all. The most common behaviors observed within the institutions included in this study are: selective waste collection, waste valorization, urban regeneration practices, and support for local producers.

We discovered that less than 20% of the institutions mentioned the circular economy concept in their strategic documents, an aspect that should not be overlooked and deserves to be explored further in the future.

Another intriguing finding in this study was that only 17.36% declared that they had submitted circular economy projects.

We wanted to see what the most common barriers are that prevent authorities from implementing EC in order to understand it more concretely. According to the findings of this study, the most common

perceived barriers by public officials are: a lack of people with expertise in the field, a lack of knowledge about the circular economy, a lack of funds allocated to this aspect, high prices, and a lack of information.

According to the descriptive analyses, very few green public procurements are made, and less than 10% claim to be familiar with the national framework of green public policies. IT equipment, energy efficiency, thermal wrapping, and buildings are the most common GPPs that occur within institutions.

Only 17.36 percent of those polled said they had received training in green public procurement, while 7.44 percent said they had received training in circular procurement.

We divided the sample into three groups based on their work experience for the inferential analyses (entry level, mid level and senior). We wanted to see if the implementation of the circular economy in institutions is related to their circular economy knowledge and seniority.

Following a simple regression, we discovered that this relationship is confirmed, and those with more than 7 years of work experience and familiarity with the concept of circular economy stated that more circular economy activities take place within their institution. At $p < 0.05$, this relationship is statistically significant.

Conclusions

According to the study's findings, very few institutions practise circular economy behaviours, which may be related to the fact that only a small percentage stated that they are very familiar with the national legislative framework for green procurement. This is an expectation that should be considered in future studies and explored during interviews.

We've shown why green procurement isn't common and what we can do to aid the transition to a green economy. Very few circular economy behaviours are carried out within institutions, which may be explained by the fact that only a small percentage stated that they are very familiar with the national legislative framework regarding green purchases. To intervene at any level, we must first understand at what level and how we should act. This article offers several suggestions to help with the transition.

The findings of this study serve as a foundation for future research on public authorities and the transition to a circular economy. We discovered some interesting aspects using the measurement tools, such as perceived barriers, the fact that these concepts do not appear in strategic documents, and there is no training, but we also investigated what kind of enablers could be very important in the transition.

Limits

The current study has some limitations, which should be considered when interpreting the study results. One limitation is that the sample size is insufficient to extrapolate to develop general assumptions on a larger scale.

Another constraint is the scale and the items we included. We recommend using interviews in future studies to ensure that we included the most important elements.

The cross-sectional correlation design requires only one measurement. As a result, explanations for the variables' dynamic nature cannot be generated, nor can causality be inferred. Another limitation of this design is that the data was collected using an online questionnaire, which meant that we had no control over environmental conditions that could interfere with the accuracy of the answers, altering those who followed the results. Also, keep in mind that people can provide desirable responses.

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IDENTIFYING THE IMPACT OF SOME FACTORS ON THE PERFORMANCE OF THE MANAGEMENT OF ERASMUS MOBILITY PROJECTS IN HEIs

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Abstract

Purpose – *The paper aims to determine the impact of some factors on the performance of the management of Erasmus mobility projects in higher education institutions.*

Methodology/approach – *There were processed a number of 427 responses obtained through questionnaires, from participants in Erasmus mobility projects, students and academic staff from Romania and abroad. The quality of responses was tested by applying Cronbach's Alpha coefficient and a factorial analysis was applied by using the principal components analysis algorithm, to group items and determine latent variables. Indicators such as, the percentage of the initial information, KMO statistics, the information retained by each item and the association coefficients, values, allowed the application of binary logistic regression.*

Findings – *Determining the factors that have a direct influence on the performance of management of Erasmus programme.*

Research limitations/implications – *Erasmus mobility projects are an important factor of internationalization in HEIs.*

Practical implications – *The findings of the paper have practical applicability in improving the management of Erasmus programme in HEIs.*

Originality/value – *Due to the pandemic situation Erasmus programme was affected by the decrease of the number of Erasmus+ mobility projects. The results of the paper may constitute reference points for HEIs in reinvigorating the programme.*

Key words: *Erasmus, Performance, Management*

Introduction

Taking into consideration that the purpose of the paper is to establish the factors that determine an improvement of the performance of the management of Erasmus mobility projects in higher education institutions, we carried out a quantitative research, based on questionnaires by using Likert scale (University of Newcastle Library, 2020). Through the SPSS Statistics program, we were able to process a number of 427 responses from Erasmus mobility participants, students, teachers and administrative staff from educational institutions, from Romania and from abroad.

In Table 1 one can see the studied variables.

Statistical validation of data

Considering that the data were achieved through the application of questionnaires with Likert measurement scale ("Statistics How To", 2022), before performing any analysis and creating latent variables, we have checked the liability of responses by using Cronbach's Alpha coefficient (Dugard, Todman, & Staines, 2010 and Koning & Franses, 2003).

By applying this coefficient, we have determined therefore the quality of the answers, respectively the degree of confidence of the results collected from the questionnaires (Brown, 2002).

Table 1. Studied variables

Studied variables	Name of the variables
Q5	How would you rate the level of promotion and information activities carried out by your home university/institution regarding the Erasmus programme?
Q6	How would you assess the quality and professionalism of the Erasmus selection competition organized by home university/institution?
Q7	How would you rate the level of professionalism and transparency regarding the nomination process at home university/institution to the partner university/institution after being selected for an Erasmus mobility?
Q8	How would you appreciate the way in which your home university/institution supported you in filling in the Erasmus documents required for the success of the mobility in the host country?
Q9	How would you evaluate the level of support received from home university/institution during the whole application process at the host university/institution where selected to carry out Erasmus mobility?
Q10	How would you assess the information and support provided by your home university/institution during your mobility at the host university/institution?
Q11	How would you rate the support provided by home university/institution regarding the administrative part after returning from mobility?
Q13.1	The way the information regarding the Erasmus programme is disseminated at home university/institution
Q13.2	The selection process of the Erasmus candidates at home university/institution
Q13.3	The nomination process of the Erasmus candidates to the host institution at home university/institution
Q13.4	The monitoring process of mobility projects at home university/institution
Q13.5	The communication process with home institution during the project mobility at the host institution at home/host institution
Q14	How would you assess the level of promptitude and reaction of the host university/institution in sending the application documents in order to get the invitation letter required for mobility?
Q15	How would you rate the level of involvement and support of the host university/institution before the start of mobility?
Q16	How would you assess the quality of the administrative procedure regarding the mobility upon arrival at the host university/institution?
Q17	How would you assess the level of support that the host university/institution has had in mobility?
Q18.1	The information provided before their arrival in the mobility at host university/institution
Q18.2	Organizing the welcoming activities (orientation week, meeting with coordinators, meeting with homologues etc.) at host university/institution
Q18.3	The administrative support the mobility (for example processing Erasmus documents: certificates of arrival and departure, learning agreement, teaching or training agreements etc.)
Q18.4	Communicating with academic coordinators
Q18.5	The manner in which the problems that students encounter during mobility are managed at host university/institution
Q19.1	Streamline the application procedures
Q19.2	A more open attitude of the staff who manages the programme
Q19.3	A better communication between partner universities
Q19.4	More online information
Q20.1	Increasing the number of staff in Erasmus offices
Q20.2	A better coordination between home and host institutions
Q20.3	Digitalization of procedures
Q20.4	Increasing the transparency of the programme
Q21.1	Erasmus offices
Q21.2	Erasmus coordinators
Q21.3	Academic staff
Q21.4	Administrative staff
Q22	How would you rate the quality of the management the Erasmus programme of the institutions you came in contact with?

In order for the data to be validated, it is recommended that the Cronbach's Alpha Coefficient registers values higher than 0.7 on each group of the analyzed items. It can be seen in Table 2 that the coefficients we have obtained are $\alpha > 0.8$ and $\alpha > 0.9$ and they indicate that the quality of the responses to the questionnaires has an internal consistency going from "good" to "excellent" ("Statistics How To", 2022).

Table 2. The values of Cronbach's Alpha coefficient

Synthetic variable (latent)	Name of latent variable	Number of items (questions)	Cronbach's Alpha Coefficient
Q5-Q11	Evaluation of the management of Erasmus mobility projects at home university/institution	7	0.929
Q13	Points in which is necessary an improvement of the management of Erasmus programme at home university/institution	5	0.934
Q14-Q17	Evaluation of the management of Erasmus mobility projects at host university/institution	4	0.897
Q18	Points in which is necessary an improvement of the management of Erasmus programme at host university/institution	5	0.960
Q19	Aspects which may improve the development of Erasmus mobility projects	4	0.881
Q20	Directions of improving the management of the Erasmus mobility programme	4	0.807
Q21	The importance of the role that Erasmus responsible play in the management of the programme	4	0.845

Taking into consideration the quality of the results achieved on each group of items, we can continue with the factorial analysis of the data by applying principal component analyses in order to create latent variables as linear combinations of initial items.

Principal component analyses

Principal Component Analysis (ACP) is also called the "Hotelling transformation or Karhunen-Loeve transformation" and is considered the "simplest analysis of eigenvectors". This analysis aims to reduce the number of variables used initially and to take into account a small number of variables that are considered representative. This analysis is "useful in reducing the number of dimensions" of the studied data and "the patterns can be identified without a significant loss of information" (Cărbureanu, 2010).

Following the principal component analyses, we obtained the data from Table 3.

For each group of items analyzed separately, we have created a latent variable as a linear combination of items. The connection between the items and the latent variable is given with the help of the coefficients that link the items to the latent variable, also called important coefficients (Table 3).

The following indicators have been used in order to analyze the quality of the latent variables created:

- The percentage of the initial information shows us how much of the initial information brought by the items is found in the latent variable (maximum value is 100%);
- KMO test measures the quality of the association between items, which shows the global quality of the analysis, statistics which register values in the range of [0; 1];
- The information retained from each item on the latent variable, registers values of up to 100%;
- The coefficients of association between the items and the latent variable, which expresses the connection between the items and the created variable, the values being in the range of [0; 1].

Table 3. The results of the factor analyses

Synthetic variable (latent)	Percentage of initial information KMO p-value	Initial items	Information retained from the item on latent variable (%)	Coefficients of association between items and the latent variable	Coefficients which link items to latent variable (Importance coefficient)
Q5-Q11 Assessment of the management of Erasmus mobility projects at home university/institution	70,34% 0,904 p-value=0,000	Q5	59,1	0,769	0.131
		Q6	65,2	0,807	0.138
		Q7	66,5	0,815	0.139
		Q8	74,9	0,866	0.148
		Q9	81,4	0,902	0.154
		Q10	75,7	0,870	0.149
		Q11	69,6	0,834	0.142
Q13 Points in which is an improvement of the management of Erasmus programme at home university/institution is necessary	79,245% 0,858 p-value=0,000	Q13.1	71,1	0,843	0.190
		Q13.2	80,0	0,895	0.201
		Q13.3	83,9	0,916	0.206
		Q13.4	84,0	0,917	0.206
		Q13.5	77,1	0,878	0.198
Q14-17 Assessment of the management of Erasmus mobility projects at host university/institution	76,49% 0,799 p-value=0,000	Q14	68,7	0,829	0.237
		Q15	80,0	0,894	0.255
		Q16	80,4	0,897	0.256
		Q17	76,9	0,877	0.251
Q18 Points in which an improvement of the management of Erasmus programme at host university/institution is necessary	86.35% 0.902 p-value=0.000	Q18.1	79,6	0,892	0.193
		Q18.2	85,8	0,926	0.200
		Q18.3	89,7	0,947	0.202
		Q18.4	85,7	0,926	0.200
		Q18.5	91,0	0,954	0.206
Q19 Aspects which may improve the development of Erasmus mobility projects	73.81% 0.786 p-value=0.000	Q19.1	66,1	0,813	0.237
		Q19.2	78,5	0,886	0.258
		Q19.3	78,7	0,887	0.258
		Q19.4	72,0	0,848	0.247
Q20 Directions of improving the management of the Erasmus mobility programme	63.45% 0.781 p-value=0.000	Q20.1	52,8	0,727	0.228
		Q20.2	71,2	0,844	0.265
		Q20.3	60,7	0,779	0.245
		Q20.4	69,1	0,831	0.261
Q21 The importance of the role that Erasmus responsible play in the management of the programme	68.37% 0.732 p-value=0.000	Q21.1	65,9	0,812	0.246
		Q21.2	75,4	0,869	0.263
		Q21.3	66,3	0,814	0.246
		Q21.4	65,8	0,811	0.245

If we analyze the results in Table 3, we see that all latent variables resulted correspond qualitatively, ie $KMO > 0.7$, the minimum percentage of information retained is 63.45%, the association coefficients between items and latent variables are greater than 0.7.

Binary logistic regression

In order to determine the factors which, influence the performance of Erasmus mobility projects, we applied binary logistic regression. It estimates the probability of an occurring event (in this case, good management appreciation). It is also called logistic regression and is used to predict the relationship between predictors as independent variables and a predicted and dependent variable ("Binary Logistic Regression", 2022). In this case, the question Q22 "How do you assess the quality of the management

within the Erasmus program of the institutions you came in contact with?" is considered as a dependent variable X.

We have considered two states, respectively a quality evaluated by respondents as "poor", marked with 0 and a quality evaluated by respondents as "good", marked with 1, this being the observed event. Given the nature of the data of the analyzed variables (dependent and factorial), to explain the relationships between them, we applied binary logistic regression. Thus, we can say that binary logistic regression predicts the probability that an observation will fall into one of the two categories of a dichotomous dependent variable based on one or more independent variables that can be either continuous or categorical.

If the factor variables are categorical (states are expressed in words or they show periods) then it is necessary to encode their states and choose the reference category. Thus, for variable 14.1 the reference category is "more than three participations", for variable 14.2 it is "2014-2020", and for the target group the reference category is "students". The information on these codings is given in Table 4.

Table 4. Coding the states of independent categorical variables

		Frequency	Codes		
			(1)	(2)	(3)
14.1 Total number of participations in Erasmus mobility projects	One participation	159	1.000	.000	.000
	Two participations	77	.000	1.000	.000
	Three participations	39	.000	.000	1.000
	More than three participations	151	.000	.000	.000
Target group	Administrative staff	109	1.000	.000	
	Professors	86	.000	1.000	
	Students	231	.000	.000	
14.2 The time interval of the last mobility	2007-2014	17	.000		
	2014-2020	409	1.000		

For the continuous variables Q5_Q11, Q13, Q14_Q17, Q18, Q19, Q20, Q21 there is no need to establish the reference category as they are numeric variables.

If the estimated probability of an event occurring is greater than or equal to 0.5 then it classifies the event as taking place (for example, a person appreciates the quality of management as good). If the probability is less than 0.5, then it classifies the event as not being in the opposite category, ie the project management is considered weak (Hayes & Matthes, 2009). These probabilities are calculated taking into account the independent (factorial) variables in the model (Table 5.)

In table 5, we have the contribution of each independent variable to the model (coefficients B) and their statistical significance at different levels. The Wald test is used to determine the statistical significance for each of the independent variables. The statistical significance of the test can be found in the p-value column. Exp (B) show us the probability of an event occurring based on a one-unit change of the independent variable when all other independent variables are kept constant.

The representativeness of the model - which expresses the performance of management within the Erasmus program - is analyzed by using both Cox & Snell R Square and Nagelkerke R Square indicators (Table 6) which show how much the variation of the dependent variable can be explained by the model, respectively it varies between 31.5% and 57.4%. It is preferred to interpret Nagelkerke R Square because it is underlain to register values in the interval [0; 1].

In order to verify the fit of the model we have also used Hosmer-Lemeshow test (Table 7).

Table 5. Estimation of the coefficients of the factorial variables in the model

Factor variables (independent)	Coefficients B	Wald test	p-value	Exp(B)
Q5_Q11	0.187	0.814	0.367	1.206
Q13	-0.855***	8.811	0.003	0.425
Q14_Q17	1.957***	51.726	0.000	7.075
Q18	0.592*	3.562	0.059	1.808
Q19	-0.235	0.538	0.463	0.791
Q20	-0.046	0.020	0.887	0.955
Q21	0.674**	6.116	0.013	1.962
Number of participants Cat of ref- more than 3 participations		13.476	0.004	
- one participation	-0.908	2.523	0.112	0.403
- two participations	-2.173***	10.771	0.001	0.114
- three participations	-2.142***	7.087	0.008	0.117
Last mobility period	0.427	0.228	0.633	1.348
Target group Cat. of ref-students		3.405	0.182	
- administrative staff	0.243	0.180	0.671	1.275
- professors	1.317*	3.392	0.066	3.731
Constant	3.980	40.980	0.000	53.529

Significance of factors: *** with a significance level of 1%, ** with a significance level of 5% and * with a significance level of 10%.

Table 6. Representativeness of the model

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	177.826	0.315	0.574

Table 7. Testul Hosmer and Lemeshow

Step	Chi-square	df	p-value
1	5.956	8	0.652

The Hosmer-Lemeshow test is a statistical test for "goodness of fit" for logistic regression models. The test evaluates whether or not the observed events match the expected events in the subgroups of the model population. Thus, the null hypothesis is that there are no significant differences between the observed and the expected events, ie predicted by the model. As p-value = 0.652 > 0.05 it results that the null hypothesis cannot be rejected, ie the model is good.

Another modality which confirms that the model is good, is the percentage of the correctly predicted cases, ie for all cases analyzed we have a very good percentage of 92.5%. For the prediction of the "weak" state we have a percentage of 58.6% of correct predictions, and for the "good" state a very good percentage of 97.8% (Table 8).

Table 8. Classification of results

Observed		Prediction		
		Q22		Percentage of correct predictions
		week	good	
Q22	week	34	24	58.6
	good	8	360	97.8
Total percentage				92.5

Findings

We performed a binary logistic regression to determine the effects of factor variables Q5_Q11, Q13, Q14_Q17, Q18, Q19, Q20, Q21, the number of participations in Erasmus programs, the period of the last mobility and the affiliation of a target group on the probability that participants appreciate as good the quality of the management of such projects.

The model was statistically significant, $\chi^2(8) = 5.956$, $p = 0.652$, (Table 7) the variation explained being 57.4%, (table 6), 92.5% of the cases are correctly classified (Table 8).

The variables Q14-Q17 have the greatest influence on the assessment of the performance of management, respectively:

- the level of promptness and reaction of the host university in sending the application documents which are necessary for the participants in order to obtain the letter of invitation;
- the support of the beneficiaries before the start of their mobility received from the host university;
- the administrative procedures carried out at the host university on the arrival of the beneficiaries in mobility;
- the support provided to the beneficiaries at the host university during the mobility.

According to table 5, professors have a 3.73 times higher probability - compared to students - to appreciate the quality of Erasmus management, and administrative staff appreciate similarly to students. The period of the last mobility does not influence the management's assessment ($p = 0.633$) (Table 5).

Participants in more than three mobility projects have a higher probability to appreciate the quality of Erasmus mobility projects than the ones participating in one or two mobility projects.

The role of the Erasmus responsible has a direct influence on the performance of the management of Erasmus programme.

Conclusions

It seems that the host university has an important role regarding the quality of the Erasmus programme, from the respondent's point of view. This could be explained by the fact that the support and feedback of the host university is more important as it has the "power" to accept or deny a mobility and on it also depends the quality of the mobility of participants during their staying at the host university.

The fact that professors appreciate more the quality of management within Erasmus, than students or administrative staff, could be due to the fact that they provide lectures at the host university and therefore they enjoy a different status.

Regarding the fact that the people who participate in more Erasmus mobility projects have a higher probability to appreciate the quality of Erasmus programme is of a great importance and is an encouragement for universities to increase the number of mobility projects which is also an important indicator of internationalization.

In what concerns the role of the Erasmus responsible is very useful to have the confirmation of their importance in the management of Erasmus programme, as this could lead to better administrative assistance, once acknowledged.

The results of the paper are important for the management of Erasmus programme in higher education institutions and can be considered an important tool for HEIs in order to improve the performance of the management of Erasmus programme, especially by taking into consideration also the pandemic situation which lead to decrease of the number of Erasmus mobility projects and to a confuse management.

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THE CIRCULAR CONSUMER BEHAVIOR THROUGH INDUSTRY 4.0 TECHNOLOGIES IN A POST-PANDEMIC REALITY

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Abstract

Purpose – The objective of this study is to show how the Industry 4.0 technologies can unlock circular economy and how this can influence the consumer behavior, which changed by COVID-19 pandemic.

Methodology - The technologies under the umbrella of Industry 4.0 were identified, followed by choosing the ReSOLVE framework for circular economy. Then consumption behavior and end-of-life attitude were analyzed.

Findings – The 4th Industrial Revolution brought everything closer with better communication means and more interconnections which can provide patterns and correlations for more data-based decisions making in the future.

Research limitations/implications – There is still room for filling in the gap about the impact of Industry 4.0 on the circular consumer behavior, how it can enable it and where are the weak and strong points for further action.

Practical implications – The use of Industry 4.0 technologies and ReSOLVE framework can impact the circular behavior, increasing thus the circular economy adoption, being a viable option to explore for companies in order to achieve sustainability.

Originality/value – This article contributes to literature by assessing how Industry 4.0 technologies can unlock CE and how can influence the circular behavior.

Key words: circular economy; industry 4.0; consumer; ReSOLVE; end-of-life.

Introduction

The COVID-19 pandemic has strongly changed consumption behavior, determining a preference for products with efficiency features, from brands that contribute to society (people having health and environment awareness) so the sustainable development (SD) and circular economy (CE) are two essential parts for the future of humanity and for competitiveness of businesses (Das, 2022; Tao, 2022).

The paradigm of CE integration into industrial activities has as a baseline the reconfiguration of production and business models to become circular, for decreasing the negative impacts on the environment, health and society as a whole and meeting the behavioral shifts in consumers demands due to the COVID-19 pandemic, which and also increased the online collaboration and digital transformation.

This transition requires actions like redesign supply chains, efficient models in terms of energy, material use and emissions and is based on innovation and technology (Rada, 2017; Pacurariu, 2021). Technology as an enabler of CE should aim also to improve companies' sustainability, thus impacting the sustainability of society. With this goal, Industry 4.0 (I4.0) is a strong candidate as enabler to reach CE (Garcia-Muiña, 2018), integrating production systems in a horizontal and vertical way through the

use of live streamline of data, flexible and adaptive technologies for manufacturing processes and highly customizable (Rojko, 2020).

Methodology

To accomplish the paper purpose, an exploratory research has been conducted. Systemic literature review was chosen to show the links between technology adoption/use and the framework of CE. Furthermore, consumer identification is highly important for the relevance of the current study as it sets a context for further advancement into CE implementation. The analysis was articulated through a series of steps presented in Figure 1.

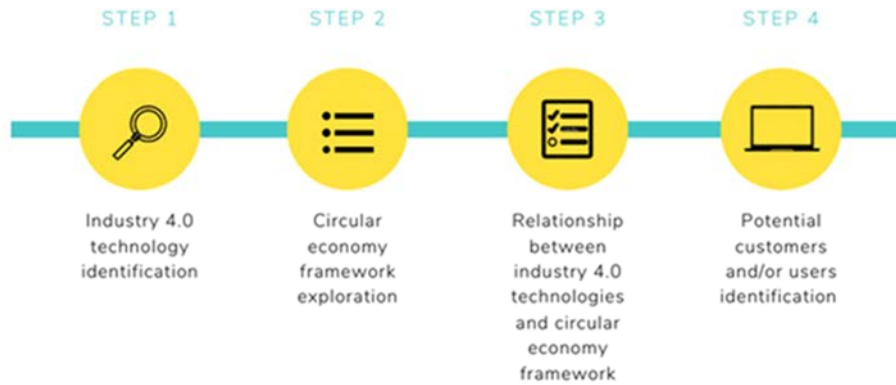


Figure 1. Research framework for the current research

Results

Technologies in the Era of Industry 4.0

The Fourth Industrial Revolution is the outcome of new solutions which reduce the mechanical and the hardware aspects of industrial processes and emphasis the evolution of software application. It is the continuous development of IT-tools and systems with high storage capacities and transmission speeds (Lele, 2019). The main technologies and defining features can be seen in the Table 1 (Gölzer, 2017; Waslo, 2017; Kang, 2018; de Sousa Jabbour, 2018; Dalmarco, 2019; Ferreira, 2021; Hettiarachchi, 2022)

Table 1. I4.0 technologies

Additive Manufacturing (AM)	Technology which prints objects in a series of overlapping layers of material without having waste from cuttings.
Augmented Reality (AR)	Combination of 3D elements with spatial context, integrated in a virtual form. Offers the possibility for real-time processing of image projections to test new products or to improve processes.
Big Data&Analytics (BDA)	It consists in the advanced use and analyse of large volumes of data, aiming to uncover trends, patterns and correlations to help in the delivery of data-informed decisions.
Cloud manufacturing	Virtual platform in the form of a network used to share resources using cloud computing, internet and virtualization. It allows for accessibility to data, systems and equipment from any device or geographic location if it is connected to the internet.
Collaborative Robotics	Robots designed to work closely with humans and used for repetitive tasks, allowing human workers focus on problems that require problem-solving skills.
Cybersecurity	Systems which allow the protection of systems, equipment, networks and users from illicit intrusion. It foresees reliability and safety improvements of the traceability of products.
Internet of Things (IoT)	A network of physical things/objects (sensors, software and other technologies) with the purpose of connecting and exchanging data with other systems/devices over the internet.

Simulations	It is a virtual testing tool which improves the feasibility analysis of new products with testing options and training for employees.
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CE framework - ReSOLVE

CE has several value drivers – extending the products’ usage cycles, enhancing the utilization through sharing practices, resource productivity, closing the loops of materials through reuse, remanufacture, recycling, redesign, and preserving and regenerating the natural resources. To enable the drivers, the ReSOLVE framework was chosen for this research (Ellen MacArthur Foundation, 2015; de Sousa Jabbour, 2018; Esmaeilian, 2020; Cagno, 2021).

Regenerate – it is enabled through biological cycles to facilitate energy and material circulation and to convert organic waste into sources of energy and secondary materials for different cycles.

Share – is the underlying base for sharing economy where goods are shared between individuals, not owned. The design of products should ensure they have a long lifespan and maintenance and repair is available to enhance re-use and extension until the end-of-life.

Optimize – requires a technology-centered strategy where digital technologies (sensors, automation, RFID, remote sensing etc.) are being used in the manufacturing to reduce waste generation, increase performance, efficiency and efficacy.

Loop – Technical cycles can restore the value of post-consumption products as it is the case with anaerobic digestion, as in the case of repair, reuse, remanufacture and recycling.

Virtualize – A strategy focused on services where the aim is to replace the physical products with dematerialized, virtual products.

Exchange – Substitution of old and inefficient products with renewable, advanced ones in order to optimize the continuous flow and availability of rare elements on the market.

Circular Behavior for Consumption

Consumers are key players in the field of CE, contributing to the adoption/rejection of CE implementation on the market and to the adoption of circular principles into their lifestyles and use them in the decisions they take (Rutitis et al., 2022). In this regard, they have the following roles through their consumption patterns (Esmaeilian, 2020):

Purchase behavior – for the circular products choice (used, remanufactured, green etc.).

Consumption behavior – customer’s behavior in terms of energy conservation, sharing, green consumption, waste prevention, reduced consumption and local choices.

End-of-life behavior – the action followed by customers at final stage of products life (repair, recycle, reuse, integration into trade-in programs, sustainable discard of objects).

Table 2. Industry 4.0 technologies in the CE framework ReSOLVE with their stage of implementation and consumption behavior

Technology	CE						Consumption		
	Regenerate	Share	Optimize	Loop	Virtualize	Exchange	Purchase behavior	Consumption behavior	End-of-life behavior
Additive manufacturing			x	x		x	x		
Augmented Reality			x		x				x
Big Data & Analytics		x	x	x			x	x	x
Cloud manufacturing		x	x		x			x	x
Collaborative Robotics	x		x			x			x
Cybersecurity		x	x				x		

Internet of Things	x	x	x	x	x	x	x	x	x
Simulations	x		x		x				x

Discussion and Conclusions

Nowadays, in the era of digitalization and automatization, rapid progress is happening due to innovation in sensors, devices, networks and machine learning. This affects the whole society and environment, education, health and lifestyle, pinpointing the importance of SD which integrates technologies of I4.0, that have an even greater role in enabling CE design and implementation as it can be seen in Table 2.

Regeneration of materials can be fostered by I4.0 through the use of Collaborative robotics and IoT in the form of sensors and computer/telephone apps. Through prior Simulations, the optimal design of the operation management can be established and when at the desired stage, the plan is ready to be implemented (Ellen MacArthur Foundation, 2016).

The Sharing model - BDA can determine where the sharing economy presents the highest potential for development. Analyzing large volumes of data can also be useful for creating networks and connecting people with the same needs in terms of “want to be shared” products or services, enabling connectedness and facilitating communication. Additionally, IoT and Cloud manufacturing play a similar role. Websites and mobile apps have proved that people engage in finding others to connect and share information and the data retrieved can help better establish the product/service design for better utilization or replacement and increase customer satisfaction at the same time (Dev, 2020).

I4.0 technologies provide useful room for *Optimization*. Additive manufacturing (AM) reduces the material waste. 3D printing for instance leaves the smallest quantity of scraps possible. Collaborative robotics can also ensure efficiency in production where human errors are reduced. AR and Simulations can help design the most optimal plan from the incipient phases, detect industrial symbiosis opportunities and simulate the whole industrial process. As an addition, IoT, BDA, use of cloud networks and Cybersecurity optimize the collection process and objects (Hofmann, 2017). They are able to identify failures, can provide performance parameters for highest efficiency of machines, can be checked in real-life time to have an accurate picture of the process.

The *Loop* business model is a broad part of the CE especially significant for the extension of the circulation of materials and energy, with the closure of the loops at the end-of-life. AM can enable this through the use of recycled materials in the 3D printing processes. The loops can be narrowed down and closed through modular design for components with instructions of how they can be disassembled and recycled at the end of life. Moreover, sensors can provide product passports for each of the products with relevant information about their circularity. BDA can afterwards track down how circular products are, how they circulate in the physical space and where improvements can be made (Piccarozzi, 2018; Ferreira, 2021; Kamble, 2021).

As *Virtualize* is the transition from physical products to services, here Simulations and AR can establish the smoothest pathway to achieve this transition, having the capability to promote products through a different lens, with vivid sensorial activation for the future consumers of virtual products. IoT and Cloud can connect the organizations, suppliers and customers as platforms for offers, platforms being able to collect information regarding the consumer behavior which organizations can use to improve service design.

Exchange aims at substituting the inefficient products with sustainable ones. AM adoption and IoT can advance the manufacturing production to reduce waste generation, to ease waste collection, separation and recycling. Collaborative robotics are by themselves an upgrade in terms of equipment efficiency and can optimize the continuous flow of production (Despeisse, 2017).

As far as consumers are concerned, technologies can play an important role as well. AM can foster the purchase behavior for customers as they offer new and attractive solutions to the market. 3D printing is looked into by many and if accessible on the market, will stir customers to engage in purchase behavior. AR and Simulations can offer customers visualizations of how the end-of-life of products can look like and can offer companies the model of how end-of-life should look like. Moreover, this can bring advertising strategies to reach the desired outcomes from the consumers. BDA can play an extremely important role in the fostering the consumer behavior to benefit from the I4.0 technologies. Moreover, IoT and cloud technologies are helpful as information sharing networks, platforms for connectivity and

easier access to stored information, all protected through Cybersecurity. As a complementary approach, collaborative robots can mend where consumers cannot accomplish the desired separate collection rates, they can separately collect the waste.

Given the fact that humanity has gone through difficult times due to the Covid virus, we must all the more align ourselves with SD, which has as its main goal the good of society along with economic prosperity and a clean environment, in this context production and consumption behavior playing a key role.

CE will develop further as well, through the described technologies. There is still room for filling in the gap about what is the impact of industry 4.0 on the circular consumer behavior. CE promises an action-oriented approach to achieve SD, therefore, the use from technology and innovation cannot be missed (Lakatos, 2021; Székely, 2020). It is an imperative that CE entails smart technologies which can facilitate the transition.

The technologies development and the improvements in the manufacturing procedures have created room for efficiency and performance through robots, IoT, easy communication systems with online networks and virtual realities, representing means for predicting patterns and correlations for more data-based decisions making in the future.

Companies can combine CE and technologies for reasearch and influencing the circular behaviour patterns, to redesign circular business models for met a SD with associated benefits in terms of economics, society and environment, so necessary things in this COVID-19 pandemic context.

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A NEW STRUCTURAL MODEL OF ORGANIZATIONAL BEHAVIOR INFLUENCED BY PERSONALITY FACTORS

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Abstract

Purpose – The consequences of the coronavirus (COVID-19) pandemic on young adults in terms of traits personality with changes in organizational behavior are the main concern of the present paper.

Methodology/approach - The authors invited students to participate in an on-line questionnaires - The Big Five Inventory and conflict questionnaire. Descriptive statistical analysis of observed data, testing research hypotheses, development of a model for organizational behavior, analysis of the connection between organizational behavior and personality traits using a Structural Equation Model (SEM).

Findings – Applying a quantitative research based on BFI questionnaire; the use of a statistical methodology for the evaluation of personality traits within organizational behavior; implementation of the SEM; proposals for solutions to improve organizational behavior.

Research limitations/implications – the proposed structural model is specific only to the analyzed group of respondents, but the methodology used has a pronounced character of generality.

Practical implications – the applicability of the research is found in the developed methodology, and in the understanding of the relationships between personality factors and the moderator effect of young adults.

Originality/value – The research proposes a quantitative statistical methodology for evaluating the personality factors of young adults in the post-pandemic period. The results are compared with the ante pandemic ones.

Key words: Organizational behaviour, Structural model, Statistical analysis

Introduction

The Model of the Five Factors was discovered empirically by Tupes and Christal (1961) by revisiting Cattell's data comprising sets of bipolar adjectives. The five main factors identified were Extroversion, Conscientiousness, Emotional Stability, Agreeableness and Culture (Intellect/Openness). Initially, the structure of personality types is person-centered, later it is expressed through personality dimensions (Isler et al., 2017).

Costa and McCrae (1994) present the five factors as fundamental psychic dispositions with biological bases, indirectly observable and can provide explanations for characteristic psychic adaptations. Psychic adaptations are acquired and include habits, attitudes, skills, values or reasons:

- ✓ extroversion – represents the tendency of the individual to be assertive, active, and in search of emotions, getting involved in the activities of the outside world (Watson and Clark, 1997). Its main dimensions are: affectivity, sociability, assertiveness, level of activism, search for positive sensations and emotions (Goldberg et al., 2005);
- ✓ conformism – highlights the personal characteristics that stimulate and incorporate social cooperation and harmony; considers six dimensions, namely: trust, morality, altruism, cooperation, modesty and compassion (Goldberg et al., 2005);
- ✓ neurosis – describes the tendency to have negative emotional experiences (McCrae and Costa, 1991); it relates to the following six dimensions: anxiety, anger, depression, shyness, insatiability and vulnerability (Goldberg et al., 2005);

- ✓ conscientiousness – reflects the individual's ability to become aware of, control, regulate and direct impulses (Barrick and Mount, 1991); its main dimensions are: personal efficiency, organization, moral rigidity, the need for achievement, self-discipline and prudence (Goldberg et al., 2005);
- ✓ openness to experience represents the tendency of individuals to be imaginative, creative, perceptive and caring; it considers the following dimensions: imagination, artistic interest, affectivity, adventurous spirit, intellect and liberalism (Goldberg et al., 2005).

The worldwide situation in a post – COVID 19 era changed the organizational behaviour of people. The consequences of behaviour, especially related to emotional reactions such as fear, anger, and lack of concentration during professional work, correlated with a distortion of perception. The lack of socialization will change individuals' perspectives regarding their own lives. The studies developed in the last period indicate possible changes in personality traits: individuals with high scores in conscientiousness and agreeableness usually tend to be more conformed to rules asked by the public institutions. Social distancing was more applied by people having high conscientiousness, openness to experience, agreeableness, and low extraversion (Blagov, 2020; Carvalho et al., 2020; Chan et al., 2020). Individuals involved in social cases have high scores for agreeableness and openness (Habashi et al., 2016), but negative thoughts and rumination were observed in those with an important score for neuroticism (Caci et al., 2020; Kroencke et al., 2020).

Organization of research

The authors of the study used statistical methods to identify changes in organizational behaviour based on the BIF personality traits questionnaire applied to young adults.

The research methodology includes the following steps:

1. Definition of the study problem. The problem of the current research is the analysis of the moderating behaviour of the respondent in a conflict situation related to the factors of his behaviour.
2. Choice of questionnaires. Two professional questionnaires were chosen - one for personality factors (BIG5) and another for the moderator character of the young adult in relation to the conflict within the organization.

The instrument used to develop the research was the BFI with five dimensions: extraversion, conscientiousness, agreeableness, neuroticism, and openness. It contains 44 items. The instrument was developed by John, O. P., Donahue, E. M., & Kentle, R. L. (1991). The questionnaire uses a Likert scale: 0:strongly disagree; 1: disagree; 2: neutral; 3: agree; 4: strongly agree.

The questionnaire "Identifying the preferred approach to conflict" was processed and adapted after D.A. Whetten, K.S. Cameron and contains 20 items grouped on five dimensions, as follows: forcing (items: 1, 6, 11, 16), withdrawing/avoiding (items: 4, 9, 14, 19), settling (items: 2, 7, 12, 17), confrontation (items: 5, 10, 15, 20) and compromise (items: 3, 8, 13, 18). The questionnaire uses a Likert scale: 0 - strongly disagree, 1 - disagree, 2 - neutral, 3 - agree, 4 - strongly agree.

3. Choosing the sample of respondents. Young adults form the target population of the study. The sample is considered uniform weight. The participants are 60 students enrolled at "Gheorghe Asachi" Technical University of Iași, Romania, from the Faculty of Industrial Design and Business Management, study program: Engineering and Management. The students were invited to participate in an online questionnaire. Students who expressed interest were provided with a link to complete the questionnaire. The questionnaire using Google Forms was administered in May-June 2022, during the post-COVID-19 pandemic period. Informed consent was obtained virtually on the first page of the online survey. Participation in the study was voluntary, and participants did not receive any compensation. The participants were informed regarding the questionnaire contents and the scale and they were encouraged to use the feedback in case of misunderstands.
4. Descriptive statistical analysis of the two questionnaires, Validation tests of the questionnaire scale, testing the normality of the value series, and analysis of the parameters of the central tendency of the studied variables (Subudhi, 2021).

5. Creation of a structural model for the two scores – personality and moderation. Two structural models have been proposed, one reflective and the other formative, to analyse the relationship between personality and moderator character. The modelling environment is SmartPLS 3.0 (Sayginer, 2020).

Experimental results

The questionnaire for the analysis of the moderating factor includes 20 aspects revealed in table 1.

Table 1. Questionnaire for measuring the moderator level within an organization

Item	Description
1	I defend my position tenaciously
2	I tend to put the needs of others before my own
3	I want to reach an acceptable compromise for both parties
4	I try not to get involved in conflicts
5	I analyse in the smallest details, together with the other party in the conflict, all the issues under discussion
6	I try to find a breach, a weak point in the position of the other.
7	I support harmony in discussions
8	I'm working hard to get at least a part of what I set out to do
9	I avoid open discussion of controversial issues
10	In resolving disagreements, I openly share the information I have with the other parties
11	I like to always win the cause
12	I usually follow the suggestions of others
13	I am looking for a middle way to resolve conflicts
14	I keep to myself what I really believe out of the desire to avoid the resentment of the other
15	I encourage the open sharing of feelings and issues that concern me in discussions
16	I don't like to admit that I was wrong
17	I try not to put the other person in an embarrassing situation
18	I emphasize the advantages that would result from an agreement in which each of us would give up something
19	I encourage others to take the lead in resolving the conflict
20	I state my position only as a point of view.

The coefficient $\alpha_C=0,361$ is calculated. The questionnaire does not have consistency for statistical analysis. It can be seen that there are five inverted items 6, 9, 11, 14, 16. After inverting the variables corresponding to these items, the α_C score becomes 0,603, a value considered acceptable for statistical analysis (Ravinder, 2020).

A descriptive analysis of the variable that measures the moderator level of the members within the organization in a state of conflict was made.

$$moderator = \sum_{i=1}^{20} item_i$$

Table 2. Moderator variable - statistical parameters

Parameters	Statistic	Std. Error
Mean	55,7667	,83914
Median	56,0000	
Std. Deviation	6,49998	
Minimum	42,00	
Maximum	69,00	
Skewness	,075	,309
Kurtosis	-,981	,608

Table 3. The K-S test for the distribution of the Moderator variable

	Kolmogorov-Smirnov		
	Statistic	Df	Sig.
Moderator	,102	60	,196

The Moderator variable is normally distributed according to the K-S test (table 3). From this descriptive statistic, one can deduce a character of assertive mediator of the respondents, normal for young adults in defining the formation of their characters. The average value $m=55,77$ is representative of the group of respondents. The maximum value that could be reached is 80, and the minimum value is 0. Assertiveness is the optimal mode of solving and reporting to a state of conflict.

Validation of the consistency of the questionnaire for personality factors - the alphaC coefficient is 0,681, a value that represents a normal level of confidence in this questionnaire.

The structural model for the personality factor is made in the SmartPLC 3.0 environment, which has the advantage that it can be applied to variables that do not necessarily have a normal distribution (all the variables attached to the 44 items have a distribution different from the normal distribution). The proposed model is a reflexive one, which means that the dimensions are reflected in the items of the questionnaire (figure 1).

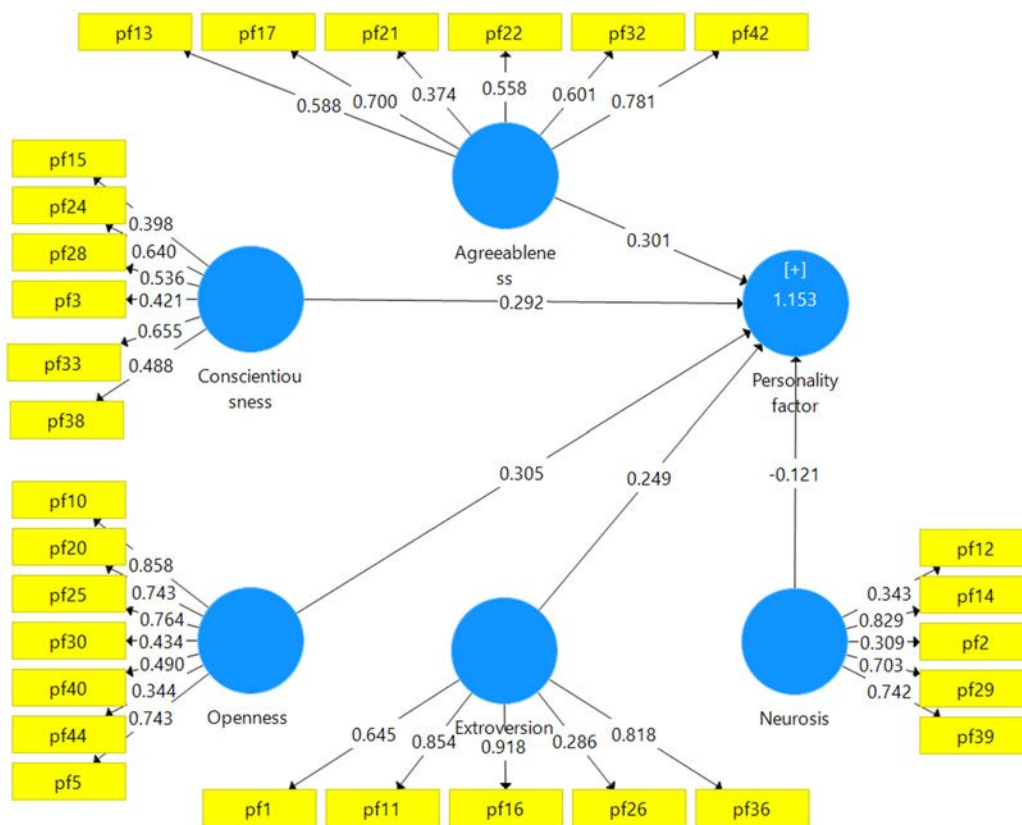


Fig.1 SEM for personality factor

This model contains the most important factors that influence the personality factor of the respondents.

The model is analyzed from the point of view of consistency - reliability (confidence level), and validity (table 4). All the values corresponding to the coefficient alphaC are $\geq 0,699$, and the mean of the variant is close to the value 0,5. According to these values, the proposed structural model is consistent.

Table 4. Validation of the SEM for personality factor

	Cronbach's Alpha	Average Variance Extracted (AVE)
Agreeableness	0,780	0,476
Conscientiousness	0,699	0,483
Extroversion	0,820	0,548
Neurosis	0,749	0,489
Openness	0,836	0,424
Personality factor	0,845	0,469

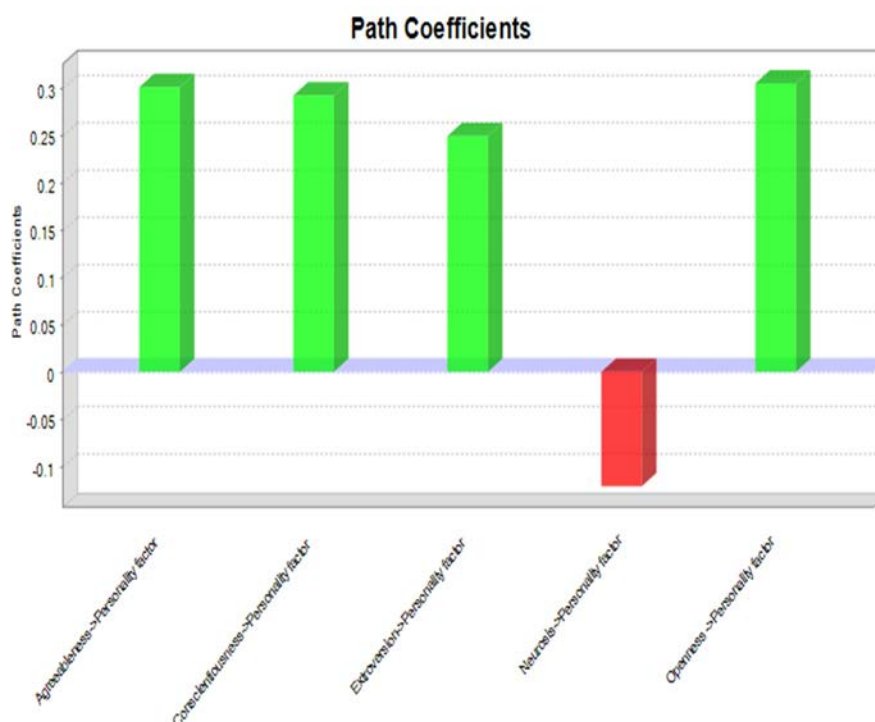


Fig. 2 Path coefficient for SEM of personality construct

It is observed that within the construct for the personality score, the four dimensions - agreeableness, conscientiousness, extroversion, openness enter with positive, approximately equal weighting coefficients, and the neurosis dimension influences the personality score inversely proportionally (figure 2).

The results obtained through this structural model conform with empirical logic and do not contradict axiomatically valid natural laws.

The personality-moderator model - is a formative model, each of the two calculated (latent) variables being the result of summing the values of all the important aspects that determine them (figure 3).

The proposed model is not supported by natural logic; it proposes an inverse correlation between the personality factor and the respondent's typology when solving conflict situations in the organizational environment.

To see where this construction comes from, we did an analysis at the level of each dimension of the personality factor related to the moderator score. Thus, all the cause-effect relationships between all the dimensions that characterize the personality and moderator character of the respondents are analyzed. The relationship between agreeableness and the moderating character is positive (0,791) (figure 4). It is a normal relationship.

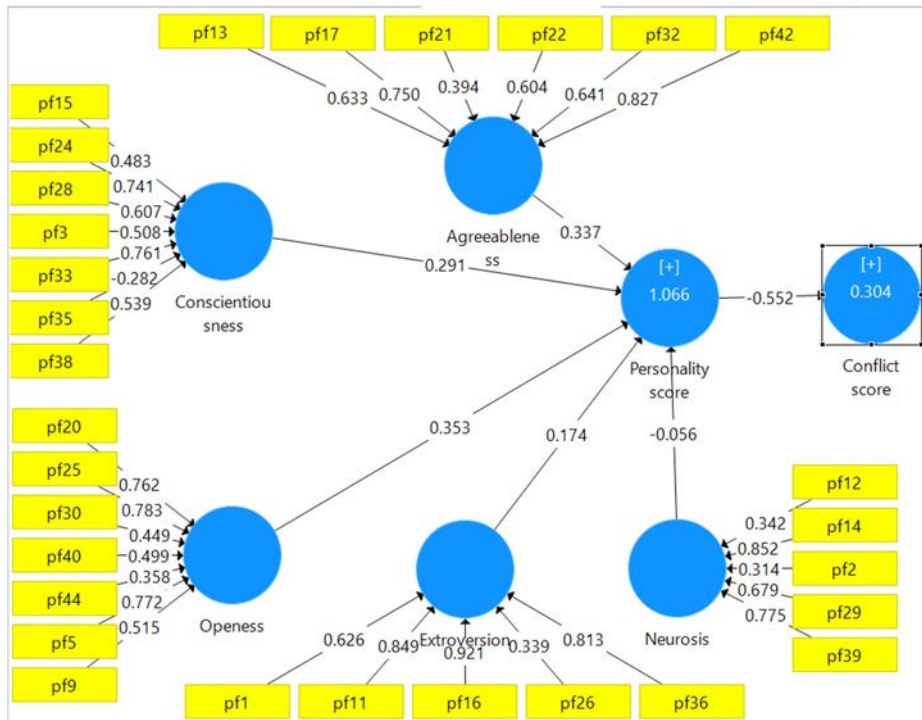


Fig. 3 The personality-moderator model

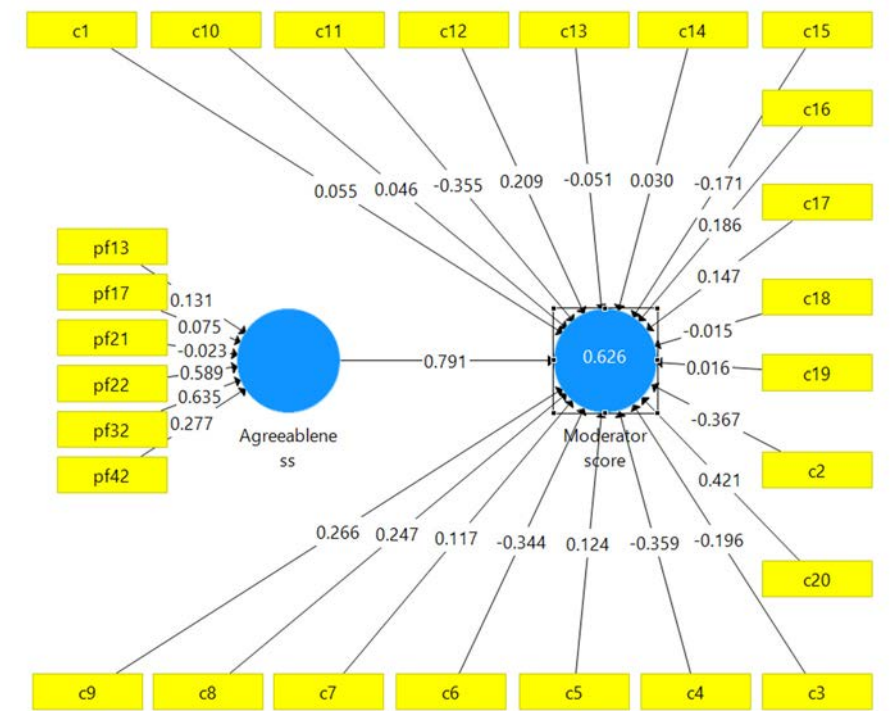


Fig. 4 The relationship between agreeableness and the moderating effect

The relationship between conscientiousness and the moderating character is positive 0,742 (figure 5).

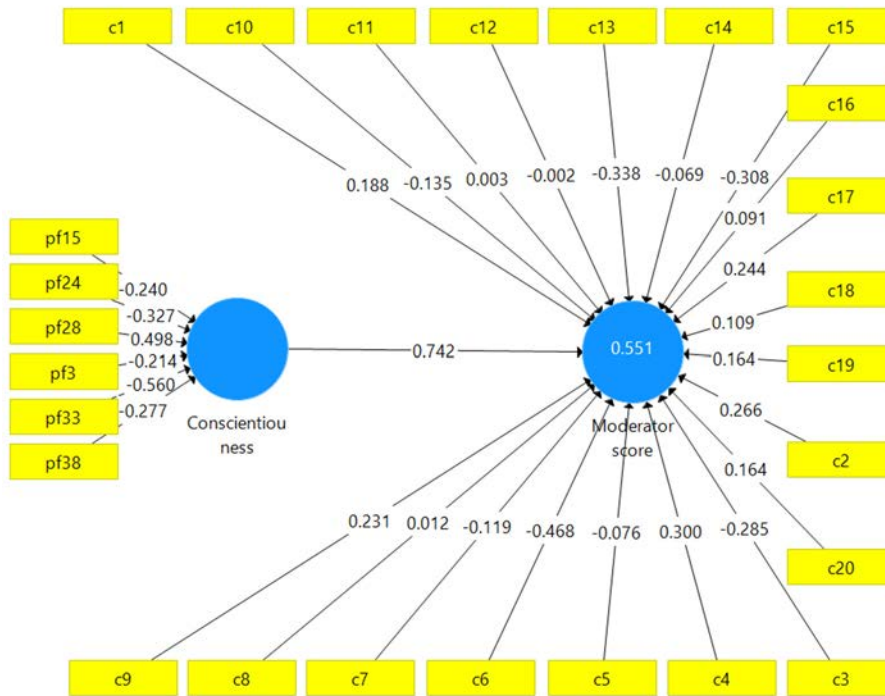


Fig. 5. The relationship between conscientiousness and the moderating effect

The relationship between openness and the moderating character is negative -0,751 (figure 6). This relationship is interesting in its logic. He says that a character that is too open negatively influences the mediator status and the involvement in a conflictual state of the individual in an organizational environment. This relationship surprises in the first phase, but a too open position is not recommended in solving a conflict situation.

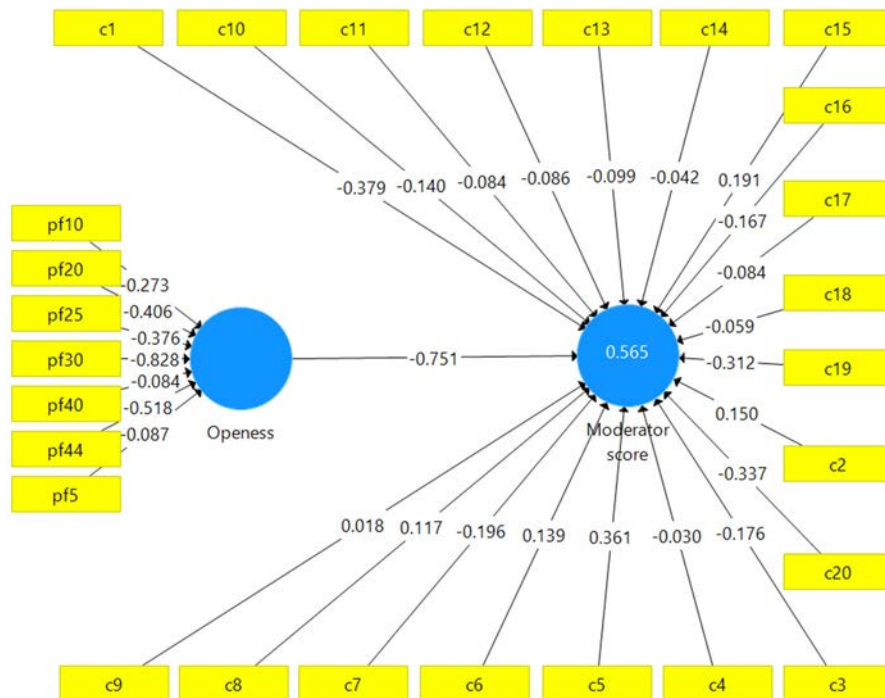


Fig. 6. The relationship between openness and the moderating character

The relationship between extroversion and the moderating character is positive, 0,704 (figure 7).

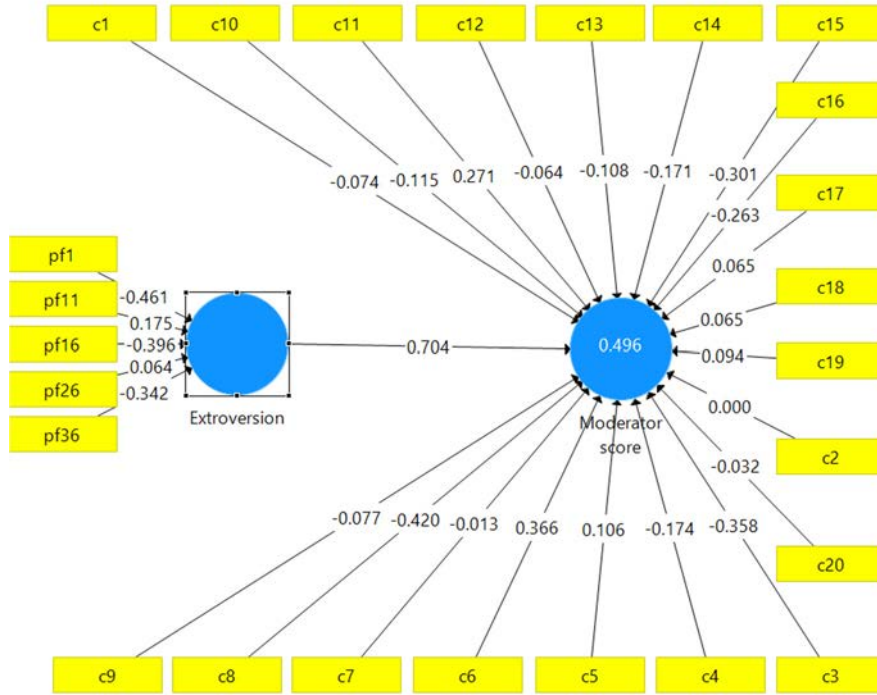


Fig.7 The relationship between extroversion and the moderating character

The relationship between neuroticism and the moderating character is negative (-0,702) (figure 8).

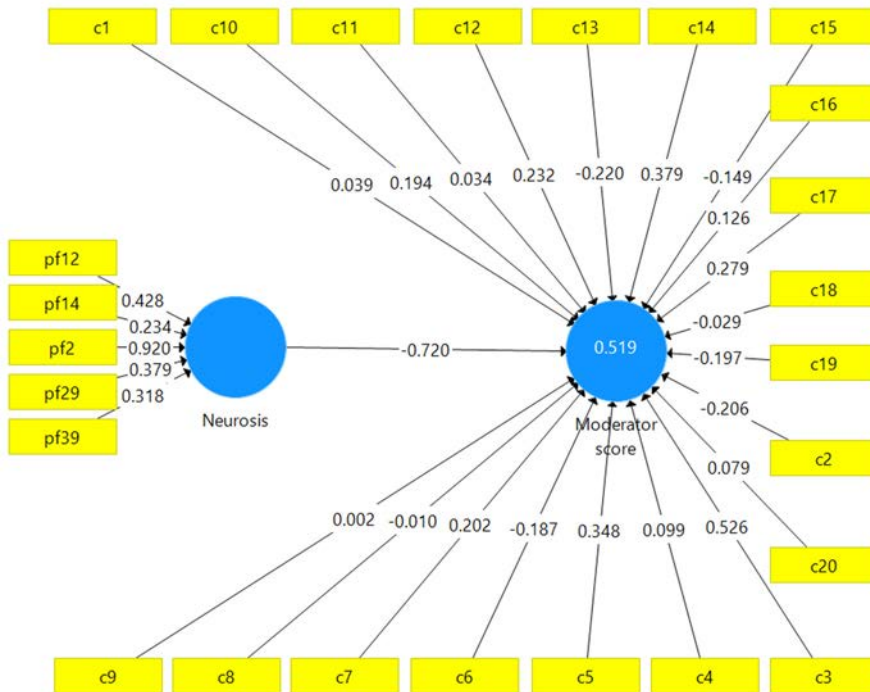


Fig.8 The relationship between neuroticism and the moderating character

Corroborated, all the domains that form the personality structure are in a negative correlation with the moderate character of the respondent.

Discussions and conclusions

The current research creates three structural models for the personality factor, the moderating factor and the relationship between the two factors. If the first two models analyzed independently are in accordance with natural logic, the structural model for the causal relationship between the personality construct and the moderating factor is contrary to this natural logic - direct proportionality. This is analyzed in the continuation of the research, and within the personality construct finds a new dimension with an inversely proportional relationship with the moderator effect – openness, in addition to the neurosis dimension.

The results of this analysis can be considered normal, unaffected by the two years of the pandemic. The explanation is that the answers are given by the students of years 1 and 2 who were protected within their families.

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ORGANIZATIONAL BEHAVIOR RESILIENCE MODEL - A COMPARATIVE STUDY

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Abstract

Purpose – the objective of the study was to identify the mechanism through which young adults faced the pandemic period in a way to maintain a subjective well-being and to perceive stress. The paper presents a compared study following the adaptative reactions of individuals that have to change during the pandemic period, in the direction of a higher resilience level.

Methodology/approach - the authors used the CD-RISC which is the suggested self-report scale for measuring trait resiliency. The modeling tool used is the Principal Component Analysis (PCA) method to reduce the terms of resilience influence in the important way. The authors compare two models for the two groups of respondents.

Findings – conducting a compared study between pre and post pandemic period regarding the resilience; Identification of the differences may occur in order to face the traumatic experiences at the organizational behavior level.

Research limitations/implications – the models are limited to the type of respondents approached in the research, but the methodology has a practical character in the research of social phenomena.

Practical implications – the paper represents a quantitative analysis tool of some psycho-social phenomena characteristic of young adults.

Originality/value - the research work is a useful quantitative analysis tool in understanding the evolution of the phenomenon of resilience in the case of young adults and the factors that determine it.

Key words: Principal Components Analysis, resilience factor, statistical methods

Introduction

According to Rutter (1985), resilience is the ability to recover or adaptive coping despite adversity or exposure to stress factors.

There is a consensus that resilience plays a vital role in the way a person experiences traumatic events (Arnau, 2002; Carle & Chassin, 2004; Juffer, Stams, & van IJzendoorn, 2004), and that involves adapting it successfully despite the situational risk factors (Carle & Chassin).

The interest in resilience was initially dependent on negative external changes. Carpenter, Walker, Anderies and Abel (2001) identify resilience in the context of a system's optimal functioning, which involves significant positive changes that lead to the development of the individual.

More and more researchers are adopting a definition of resilience, often intuitive, describing resilience as the ability to recover from a shock (Walker, Carpenter, and Kinzig, 2004). Carpenter & Brock (2008) insists on understanding the process of reorganizing a system with the aim of optimal functioning, following changes from inside or outside.

Resilience may represent a mechanism that explains how organizational behaviour functions under stress conditions, such as the coronavirus pandemic.

The study's objective was to identify the mechanism through which young adults faced the pandemic period to maintain subjective well-being and perceive stress.

The paper presents a comparison study following the adaptive reactions of individuals that have to change during the pandemic period in the direction of a higher resilience level.

The authors invited two student groups enrolled in courses at Gheorghe Asachi Technical University of Iași, Romania, Economical Engineering specialization (n1=137 and n2=123) to participate in an online questionnaire. Students who expressed interest were provided with a link to complete the questionnaire. The research using Google Forms was administered in February – March 2016 before the COVID pandemic and May June 2022 during the post-COVID-19 pandemic. Informed consent was obtained virtually on the first page of the online questionnaire. Participation in the study was voluntary, and participants did not receive compensation.

To measure the level of trait resiliency in participants, the authors used the CD-RISC, the suggested self-report scale for measuring trait resiliency (Connor & Davidson, 2003).

The modelling tool used is the PCA (Principal Component Analysis) method to reduce the terms of resilience influence in a significant way. The authors compare two models for the two groups of respondents with statistical methods.

Organisation of research

The research is structured on the steps of comparative analysis of the data obtained from the completion of some questionnaires by a sample of respondents.

The research methodology includes the following aspects:

- Defining the research problem and motivating the theme. The problem is the comparative analysis of the resilience factor in the organisational framework before and after the pandemic period. The topic is actual and necessary for understanding the dynamics of the resilience factor after two years of an intense health crisis. A second reason for the importance of the studied theme is that a characteristic model, well-made on the specified type of respondents, leads to a better understanding of the evolution of the state of resilience, and a prediction of its dynamics can be made. We know that the effects of two years of health crisis are not clearly seen in such a short time. Still, these models can be compared with those generated in the near or more distant future, developing a clearer understanding of the phenomenon.
- I was choosing the questionnaire. For this analysis, a Cd-RISC professional questionnaire was selected and used in many international studies for the analysis of the resilience factor in different response groups. The questionnaire is applied to two groups of respondents, in the same social category and in the same age range, the application interval being six years, 2016 - 2022. The analysis was focused on two different groups of young adult respondents, students at the Technical University "Gh. Asachi" from Iasi, years 1 and 2.
- Implementation of input data (input variables) of the model and output variables. The 25 items form the input variables. They are grouped into aspects that will be analysed from the point of view of the relationship with the resilience factor. The output variable, the resilience factor, was defined by summing the values of the input variables (Taherdoost, 2020).
- Descriptive statistical analysis on the output variable related to the two groups of respondents. The distribution of the resilience factor in the two groups of respondents is analysed, determining the comparative values of the distribution parameters. The distributions of the items are analysed to choose the types of statistical tests for the analysis.
- Comparative statistical analysis on the most important aspects that characterise the resilience factor. The non-parametric Mann-Whitney U test was applied to analyse the frequency histograms of the ranks for the essential elements of resilience.
- Implementation of factorial models for each group of respondents to observe the most important items within the model - PCA method (Sidharth et al. I, 2017).

Experimental results

1. Descriptive analysis of resilience factors for the two groups

Descriptive analysis for the 2016 group.

The resilience variable is made up of the sum of all 25 items. The histogram of the series is presented in figure 1.

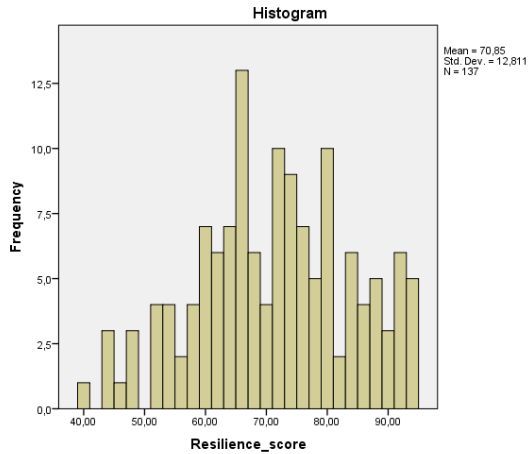


Fig.1 Histogram of the resilience variable for the 2016 group

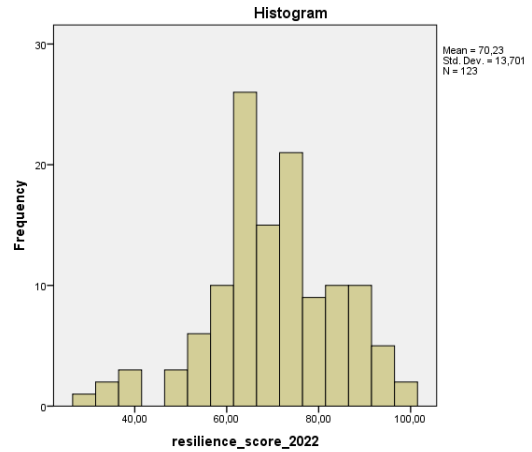


Fig.2 Histogram of the resilience variable for the 2022 group

The K-S test to analyse the distribution of the resilience variable (table 1) specifies that the variable is normally distributed.

Table 1. Resilience variable for 2016 group – normality test

K-S test	Statistic	df	Sig.
Resilience_score	,049	137	,200*

The descriptive statistics data are presented in table 2.

Table 2. Resilience variable for 2016 group – descriptive statistic

		Statistic	Std. Error
Resilience_score	Mean	70,8540	1,09453
	Median	71,0000	
	Variance	164,126	
	Std. Deviation	12,81115	
	Minimum	40,00	
	Maximum	94,00	
	Range	54,00	
	Interquartile Range	18,00	
	Skewness	-,125	,207
	Kurtosis	-,590	,411

The value of the average parameter $m=70.85$ is representative of the entire series. This value represents a high level of termination (value in the range [70;100]), which is not surprising.

Descriptive analysis for the 2022 group. For this respondent group, the resilience variable maintains the normality of the distribution (table 3).

Table 3. Resilience variable for 2022 group – normality test

K-S test	Statistic	df	Sig.
Resilience_score	,073	123	,165

The histogram of the resilience variable for the 2022 group is presented in figure 2.

The descriptive statistics data are presented in table 4.

Table 4. Resilience variable for 2022 group – descriptive statistic

		Statistic	Std. Error
Resilience score	Mean	70,22	1,23
	Median	70,75	
	Variance	187,71	
	Std. Deviation	13,70	
	Minimum	29,00	
	Maximum	98,00	
	Range	69,00	
	Interquartile Range	16,00	
	Skewness	-,408	,218
	Kurtosis	,520	,433

The mean of the resilient series, representative of the normally distributed series, has a value of 70,2276, a value corresponding to a high level of resilience for the 2022 group.

Comparing the two average values for the resilience factor corresponding to the two groups of respondents, we notice that they are approximately equal. The only observed difference is a greater degree of variability for the 2022 group. The resulting conclusions can be explained by the nature of the two groups of respondents.

2. Analysis of the frequency ranks of the resilience variable

If the level of resilience for the two groups is the same, we will analyse their distribution frequencies. Since the resilience variable consists of non-normally distributed series, we will use the Mann-Whitney U test to analyse the ranks of the series values (Yonghwan, 2018). The resilience variable for the two groups of respondents (before and after the pandemic) has the same distribution (figure 3).

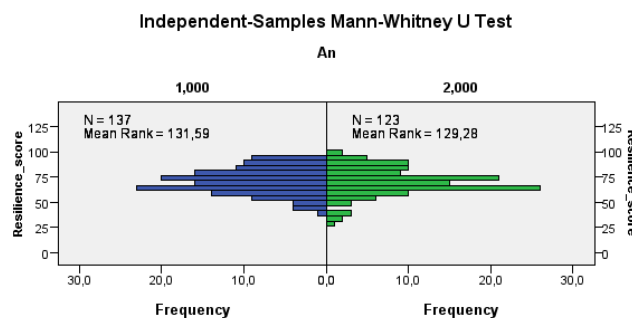


Fig. 3 Distribution of the Resilience variable for the two groups of respondents

According to the non-parametric Mann-Whitney U test (Qing He, 2020), the null hypothesis H0 is accepted: there is no difference between the distributions of the value ranks of the two analysed groups, with a confidence level of 95% (p-value=0,804). Furthermore, it can be seen that the average of group 1 has a slightly higher rank level than the average rank of group 2 (131,59 vs 129,28), which strengthens the conclusion that the level of resilience has not changed for the questionnaire respondents (figure 3).

This conclusion is consistent with natural logic, namely that the respondents are young adults who went through the pandemic protected by their families.

The only aspect that is different is item rz24, "I act in such a way as to achieve my goals, no matter what obstacles I encounter in the way", which has different distributions (figure 4). There is a difference in the positioning of the average value of 120 vs 142 in favour of group 2, which went through the pandemic period.

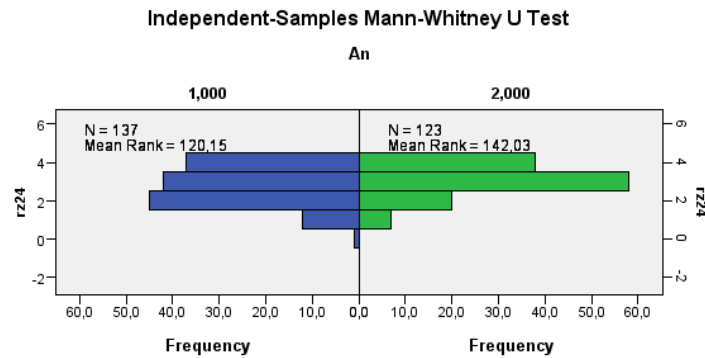


Fig. 4 Distribution of the rz24 aspect for the two groups of respondents

Three aspects considered to be essential and defining for the resilience score for the two groups of respondents were analysed: "acceptance of change" (table 5) (figure 5), "self-control" (table 6) (figure 6) and "tenacity" (table 7).

Table 5. „Acceptance of change” aspect, with its items

Aspect	Item	Description
Acceptance of change	1	I can adapt when changes occur.
	4	I can handle anything that comes my way.
	5	Past successes give me confidence in front of new challenges and difficulties.
	8	I tend to recover quickly from illness, injury or any other hardships.

For the acceptance of change aspect, it can be observed that the structure of the resilience level is approximately the same (figure 5). The ranks of the two mean values are roughly equal. The statistical analysis does not surprise us.

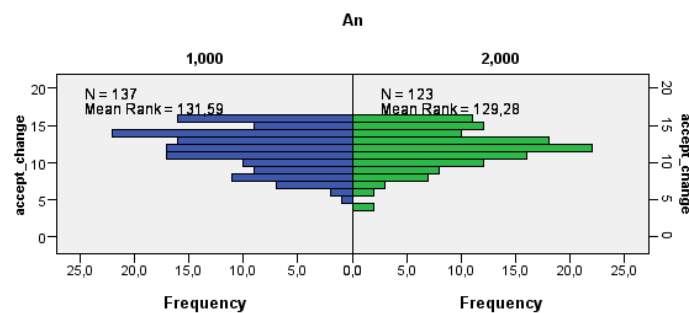


Fig. 5 Distribution of resilience ranks for the "Acceptance of change" aspect

Table 6. „Acceptance of change” aspect, with its items

Aspect	Item	Description
Self-control	21	I have a clear purpose in life.
	22	I feel in control of my life.

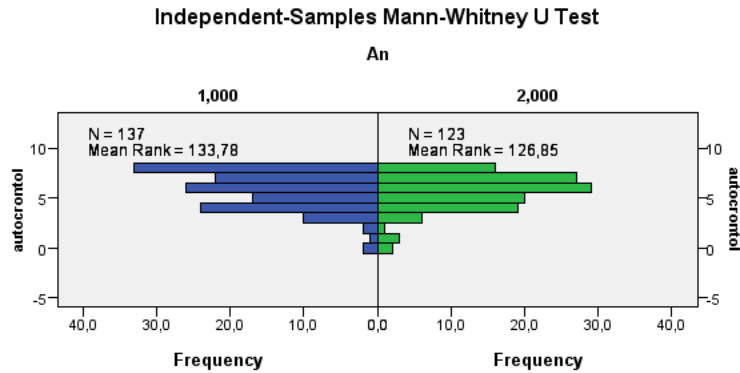


Fig. 6 Distribution of resilience ranks for the "Self-control" aspect

Table 7. Tenacity aspect, with its items

Aspect	Item	Description
Tenacity	10	I try my best, no matter what the result is.
	12	Even when things seem hopeless, I don't give up.
	16	I am not easily discouraged in case of failure.
	24	I act in such a way as to achieve my goals, no matter what obstacles I encounter on the way.

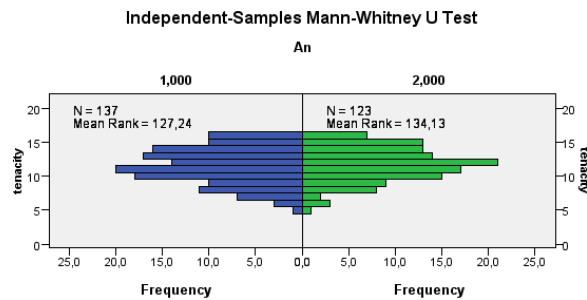


Fig. 7 Distribution of resilience ranks for the "Tenacity" aspect

There is a difference in the rank for the average indicator of 127 for the first group of respondents, lower than the value of 134, which represents the average rank of group 2, which leads to the conclusion that after the pandemic period, the level of tenacity increased. The respondents are more persistent, and we can consider, by correspondence with the tenacity of the materials, that the pandemic period generated an increase in the level of resilience from the point of view of tenacity.

3. Analysis of the resilience score component

For this analysis, we made a factorial reduction to the most important aspects that make up resilience (Zhang, 2015). The method used is CPA and is applied separately to the two groups of respondents (Laxmi, 2016).

After applying the CPA method reducing the 25 items to 7 factors, for 2016 group (table 8) and 2022 group (table 9) and determining the most important items that make up these factors, we obtained the following results (table 10).

Table 8. Application of the CPA method to the data of the 2016 group

Component	Initial Eigenvalues			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	7,152	28,609	28,609	3,915	15,659	15,659
2	2,459	9,835	38,444	3,674	14,695	30,354
3	1,476	5,904	44,348	2,310	9,238	39,592
4	1,349	5,397	49,744	1,918	7,673	47,265
5	1,275	5,101	54,845	1,452	5,808	53,074
6	1,142	4,568	59,413	1,380	5,518	58,592
7	1,053	4,211	63,624	1,258	5,033	63,624

Table 9. Application of the CPA method to the data of the 2022 group

Component	Initial Eigenvalues			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	8,510	34,042	34,042	3,960	15,840	15,840
2	1,852	7,409	41,450	3,631	14,525	30,364
3	1,462	5,848	47,299	2,415	9,661	40,026
4	1,200	4,801	52,099	1,746	6,986	47,012
5	1,156	4,624	56,723	1,639	6,554	53,566
6	1,089	4,354	61,078	1,607	6,428	59,994
7	1,041	4,162	65,240	1,312	5,246	65,240

Table 8. The most important items for resilience

Group 2016	Group 2022
rz21	rz16
rz22	rz01
rz25	rz19
rz11	rz22
rz12	rz08
rz17	rz17

The differences are:

In 2016, the most important aspects that determine the level of resilience (in descending order) were: self-control (rz21, rz22), high standards (rz25, rz17), and personal competence (rz11), tenacity (rz12).

The respondents from the year 2022 consider the following aspects to be the most important: tenacity (rz16), acceptance of the change (rz1, rz8), tolerance to negative effects (rz19), self-control (rz22) and high standards (rz17).

The pandemic period changed the order of importance of aspects related to resilience by introducing new elements: "acceptance of change" and "tolerance to negative effects".

Discussions and conclusions

The first conclusion drawn from the research conducted is that the level of the resilience factor, analysed in young adults (19-22 years old), has not changed at all after a difficult period of the health crisis.

Statistical models generated on the two response groups only indicated an increase in the diversity of the important aspects that build the personality factor of the post-pandemic group compared to the pre-pandemic one. There were two new aspects considered by the response of the second group - "acceptance of change" and "tolerance to negative effects". These two aspects are intrinsic, and I think they are not aware of the respondents.

Another aspect that has a different distribution in the formation of the resilience factor is "tenacity", an average of 134 of group 2 compared to 127 (group 1), but we believe that this is not due to a single factor - the pandemic period.

It is very good that the study demonstrated a high level of resilience in the type of respondents analysed, a conclusion that does not violate natural logic - the explanation is that the students come from a protective family environment, without responsibilities.

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THE ROLE OF DIHS IN FACILITATING THE DIGITAL TRANSITION. A COMPARATIVE ANALYSIS: ROMANIA - EU

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Abstract

Purpose – The study maps the Digital Innovation Hubs (DIHs) in Romania (based on the European Union comparison) and identifies the main features of the Romanian DIH system.

Methodology/approach - Data was collected from secondary sources (Smart Specialization Platform – S3P). The comparative and descriptive analyses allowed the shaping of the Romanian DIHs profile.

Findings – The analyses indicated that Romania is below the EU average in terms of the established DIHs. Romanian DIHs offer services at regional level and do not cover all sectors and service categories delimited in S3P.

Research limitations/implications – The study provides representative conclusions only for Romania. However, based on the proposed methodological model, the analyzes can be extended to other EU countries.

Practical implications – The study results are useful both to SMEs in Romania (seeking support for digital transition in the post-pandemic period), but also to organizations that are interested in creating associative structures in the form of DIHs. For these, knowing the current profile of Romanian DIHs becomes essential, because it allows intervention on sectors and services not covered by existing hubs.

Originality/value – From the data known by the authors, until this date a complex analysis of all DIHs registered in Romania has not been performed. Therefore, the study fills the literature gap and contributes to a more advanced knowledge of Romania's situation compared to the EU.

Key words: digital innovation hubs, Romania, European Union.

Introduction

The Digital Europe Program, for the 2021-2027 period, aims to increase EU competitiveness by providing financial support for the development of key fields (artificial intelligence, high-performance computing, cyber security, advanced digital skills and digitalization of public administration and interoperability). The ultimate goal of the program is to ensure the digital transition and recovery of the European economy due to the COVID-19 pandemic crisis.

The main actors of the program are the Digital Innovation Hubs (DIHs), which have to facilitate the access of enterprises to new technologies, in a customized ecosystem through an adequate level of cyber security, which will facilitate digital innovation and economic development. DIHs serve both private and public sectors, facilitating access to innovative solutions. As legal entities, DIHs are created by an organization or group of organizations, that make their services available to SMEs and other entities. The offered services are: support services for digital transformation (which also allow testing and experimentation); support services for know-how transfer between entities/regions; support services for the development of key areas; services to provide the financial support needed to develop advanced digital skills.

The main objective of this study is to map Romanian DIHs and the EU DIHs, in order to identify and recover potential gaps. The main argument of the research is that, in the scientific literature, no studies have been identified that would allow the drawing of a Romanian DIHs profile. The study has a double utility. First, it directs Romanian SMEs to the DIHs that can best support them. Secondly, it provides

guidance to the new DIHs that will be set up and which are expected to cover sectors and provide services that are not yet provided.

Literature review

Scientific research on DIHs is at an early stage. The proof is the small number of researches published on this topic. For example, on the search date (July 5, 2022), the Web of Science platform records that in the last 5 years, 941 studies have been published, of which only 126 are assigned to the following categories: management (14), business (12), computer science information systems (12), computer science theory methods (11). Of the 126 studies, 91% are published since 2019. Most research focuses on case studies (Mauer, 2021; Rundel and Salemin, 2022, Barasti et al, 2022), or address topics of general interest, such as: the challenges and opportunities for DIHs development (Gernego et al, 2021; Georgescu et al, 2021); the services offered (Asplund et al, 2021); innovation strategies (Queiroz et al 2020); business models (Dalmarco et al, 2021) etc.

Other studies examine DIHs from the perspective of knowledge brokers (Crupi et al, 2020) or solution providers for solving social and environmental problems (Vrain et al, 2022). The Romanian researchers have published only five studies in the last 5 years. A study evaluates the extent to which the Romanian business environment has been prepared for the digital transition (Pinzaru et al, 2017). Another study analyzes the extent to which public services capitalize on digital technologies, focused on e-government services (Linearu et al, 2018). Lincaru et al (2019) analyzed the dynamics of the mechatronic field and brought into discussion the roles of the new associative structures. Grigorescu et al (2020) analyzed the interdependencies between the welfare of the population and the components of the digitalization trends.

Having this into consideration, an analysis of the Romanian DIHs profile has not yet been performed. Therefore, this study offers novelties in the existing scientific literature.

Methodology

The research methodology was based on descriptive and comparative analyzes on the DIHs profile in EU and Romania. Analyzing the UE perspective, the volume of the DIHs activity registered in Romania was compared. The analysis is based on secondary data, collected from the S3P (European Commission- EC, 2022). Although each DIH has its own virtual identity (through their own websites), the EU-managed platform provides - in a common organization - essential information about European DIHs.

To receive validation, DIHs must meet the following conditions: they are the result of a regional/national/European policy initiative; they are organized as non-profit entities; have a registered on-site headquarters and an updated website; provide support for SMEs in digital transformation.

When enrolling in the S3P, DIHs must provide the following information:

- contact details, legal representative, year of establishment and a brief description of the activity and its objectives;
- internal organization and financial information, such as turnover and number of employees;
- the identification category (fully operational, in preparation or potential DIHs from H2020);
- the geographical coverage provided (global, international, European, regional or national);
- funds accessed for funding: projects (such as Horizon 2020), European, national or regional funding, funding from clients, partners or members;
- the main partners and the technologies made available to customers;
- the market served, specifying the activity sectors and the technological readiness level (TRL); in the platform are 36 sectors defined and 9 levels of TRL;
- the annual number of clients, with details on entity size (start-ups, SMEs, large companies), area and field of activity (national or multinational, research, etc.);
- services offered- a DIH offers one or more services from the 16 predefined categories.

Based on these data, in this study we will focus on the EU DIHs and those registered in Romania.

Results and discussion

The analysis carried out for the 27 EU Member States indicated the following:

1. In the EU, 625 DIHs are registered in the S3P, with an average of 23 DIHs per Member State. Their distribution by country is not uniform. The countries with the highest number of registered DIHs are: Spain (90), Italy (73), Germany (65), France (54), Netherlands (46). The lowest number of DIHs are recorded in Malta (2), Cyprus, Luxembourg and Slovakia (5). Of the 625 DIHs, 375 are fully operational, 192 are in preparation and 58 are potential DIHs from H2020 (Figure 1).

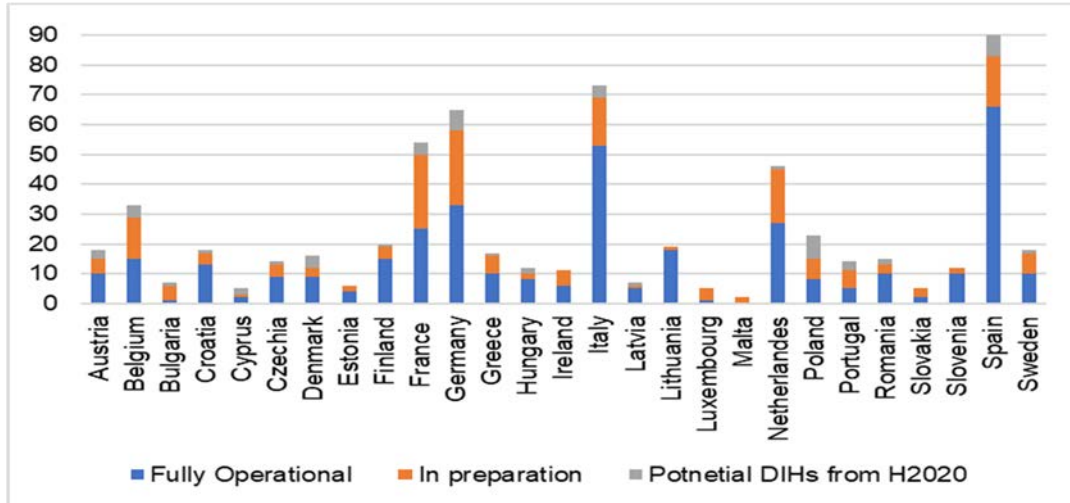


Figure 1. Structure of DIHs at EU level
Source: S3P, database processed by the authors

2. To accelerate the impact of DIHs and to support SMEs in implementing the digital technologies, EU has made available a set of tools and smart investment sources. The Horizon 2020 program aims to support research and development of communications and information technology. Thus, European DIHs network are supported to provide as many services as possible for the local SMEs. The extent to which DIHs have accessed these tools is shown in Figure 2. In the “fully operational” category, 78 DIHs - mostly from Spain (17), Italy (12), Germany (9) and France (7) - have benefited from H2020 support. In the “in preparation” category, 25 DIHs applied for projects in H2020, most of which were registered in Spain (4), Germany (4), Italy (3), Luxembourg (3), Sweden (3).

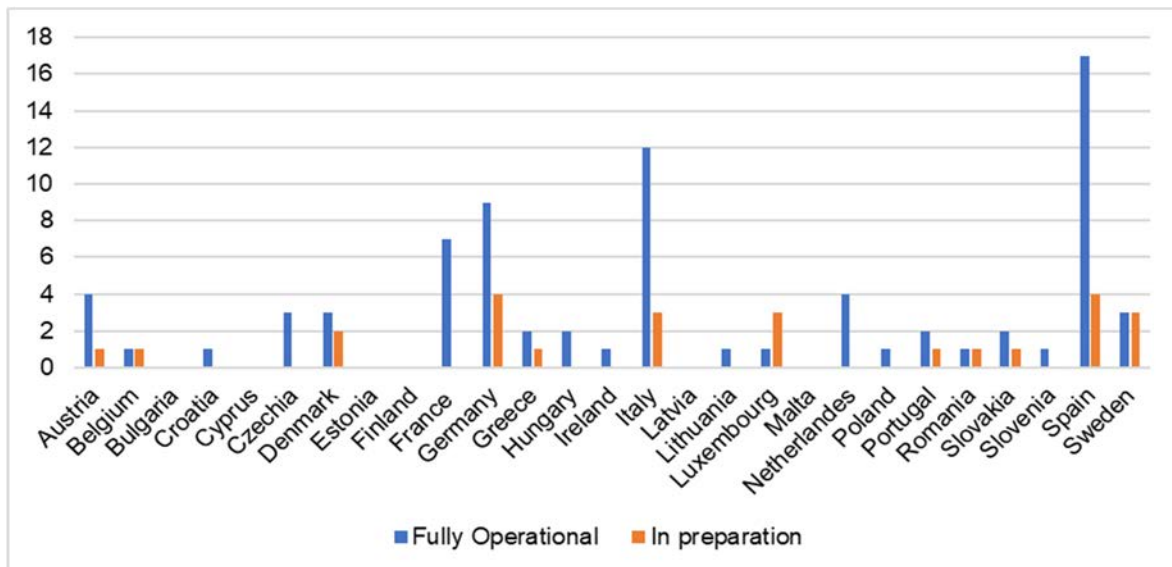


Figure 2. DIHs in H2020 projects
Source: S3P, database processed by the authors

3. The EU periodically launches calls and selects new DIHs to be part of the European network. At the time of this research, there were 316 DIHs candidate on the Smart Specialization Platform (S3P). Comparing the total number of registered DIHs at European level with the number of candidate DIHs, it shows that the states with the most registered DIHs also have the most candidate DIHs: Italy (45), Spain (40), Germany (33), France (17). The exception is Poland, which has 25 candidate DIHs, given that only 23 DIHs are registered in the S3P (Figure 3).

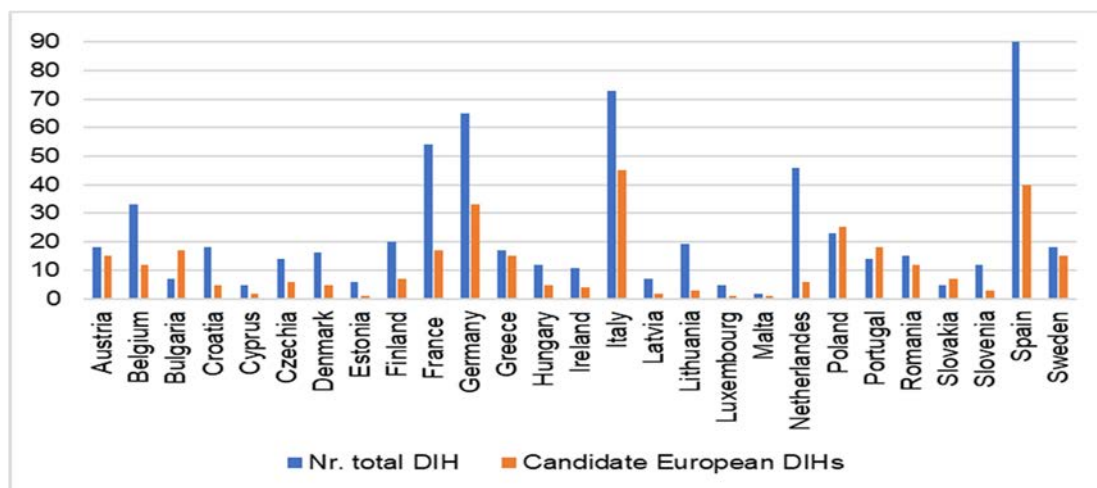


Figure 3. Candidate European DIHs
Source: S3P, database processed by the authors

The analysis carried out in Romania indicated the following:

1. In the S3P are registered 15 Romanian DIHs (Table 1 and Figure 4). Of the fully operational DIHs, most were established after 2014, with the exception of Wallachia eHub, which was established in 1991. A number of 12 DIHs provide services at the regional level, covering 6 of the 7 development regions (except the South-West Oltenia Region, in which no DIH is listed).

Table 1. Romanian DIHs

No	DIHs name	Established Year	Fully operational	In preparation	DIHs in H2020 projects	Geographical Range
1	BEIA DIH	2014	x			regional
2	CiTyInnoHub	2019		x		regional
3	Cluj IT Cluster	2012		x		regional
4	Danube Digital Innovation Hub	2020	x			regional
5	Digital Innovation Hub for Society (DIH4S)	2017	x			regional
6	Digital Innovation SMART eHUB	N/A	x			regional
7	DIH West Region Romania	2019		x		regional
8	Futures of Innovation and Technology	2020	x			regional
9	North-East Romania - Digital Innovation Zone	2017	x			regional
10	RO Tech Nation DIH	2020	x			regional
11	Sibiu Smart Systems	2015	x			regional
12	Transilvania Digital Innovation Hub - DIH	2017	x			regional
13	Universitatea de Vest of Timisoara	N/A			x	
14	Universitatea Lucian Blaga of Sibiu	N/A			x	
15	Wallachia eHub	1991	x			regional

Source: database processed by the authors from S3P

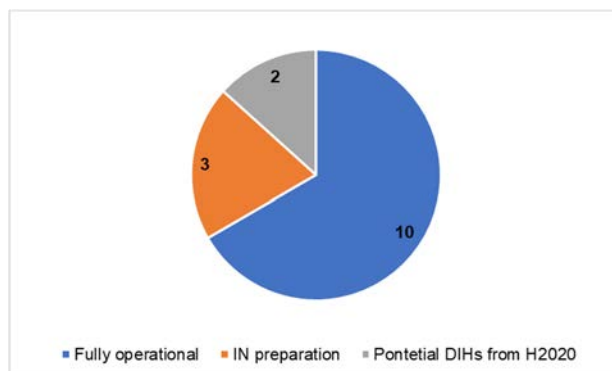


Figure 4. Romanian DIHs
Source: S3P, database processed by the authors

2. The analysis of the turnover performed by the Romanian DIHs indicated the following results: Digital Innovation Zone (North-East Romania DIH) registered a turnover of +5 million euro; BEIA DIH and Wallachia eHub had a turnover between 1 - 5 million euro; Digital Innovation SMART eHUB declared a turnover between 0.25 - 0.50 million euro; the other DIHs declared a turnover of less than 0.25 million euro.

3. Regarding the annual number of customers, 4 DIHs stated that they have more than 50 customers (BEIA DIH; Digital Innovation SMART eHUB; DIH West Region Romania; Transilvania Digital Innovation Hub - Transilvania DIH; Wallachia eHub). The other DIHs had annually between 0-5 customers (Sibiu Smart Systems), 6-10 (CiTyInnoHub, North-East Romania DIH - "Digital Innovation Zone"), 11-25 (Danube Digital Innovation Hub, Digital Innovation Hub for Society) and 26-50 customers for Cluj IT Cluster, Futures of Innovation and Technology Digital Innovation Hub, RO Tech Nation DIH.

4. The sector analysis in which DIHs offer services, indicated that education, public administration and agriculture are the best covered sectors. The services covering these sectors are provided by 10-12 DIHs (Figure 5). It is highlighted that 13 sectors are not offered by the Romanian DIHs: aeronautics and space; consumer goods/products; cultural and creative industries; defense and security; environment; chemical manufacturing; chemical products and man-made fibers; manufacture of coke; refined petroleum products and nuclear fuel; manufacture of other non-metallic miner products; pulp, paper and paper products manufacturing; publishing and printing, mining and quarrying, mobility (including automotive); professional, scientific and technical activities; telecommunications; information and communication.

5. According to H2020, 9 levels of TRL are defined: TRL1 - Basic principles observed and reported; TRL2 - Technology concept and / or application formulated; TRL3 - Analytical and experimental critical function and / or characteristic proof of concept; TRL4 - Component and / or breadboard validation in laboratory environment; TRL5 - Component and / or breadboard validation in relevant environment; TRL6 - System / subsystem model or prototype demonstration in a relevant environment; TRL7 - System prototype demonstration in an operational environment; TRL8 - Actual system completed and qualified through test and demonstration; TRL9 - Actual system proven through successful mission operations. Of the 13 Romanian DIHs, only 3 (CiTyInnoHub, Digital Innovation SMART eHUB, Wallachia eHub) cover the 9 TRL levels. Danube Digital Innovation Hub offers services only for the TRL5 level (Table 2).

6. According to the EU, 16 services categories offered by DIHs are defined: access to funding and investor readiness services (Af&i); awareness creation (Ac); collaborative researches (Cr); commercial infrastructure (Ci); concept validation and prototyping (Cvp); digital maturity assessment (Dma); ecosystem building, scouting, brokerage, networking (Ec); education and skills development (Ed); incubator / accelerator support (Is); market intelligence (Mi); mentoring (M); Other (O); pre-competitive series production (PcS); testing and validation (TV); visioning and strategy development for businesses (VSdB); voice of the customer, product consortia (Vc). The analysis of the Romanian DIHs shows that they cover most of the previously mentioned services. The largest coverage on services is Digital Innovation SMART eHUB and Futures of Innovation and Technology Digital Innovation Hub, which offers 13 (respectively, 12) of the 16 service categories (Table 3).

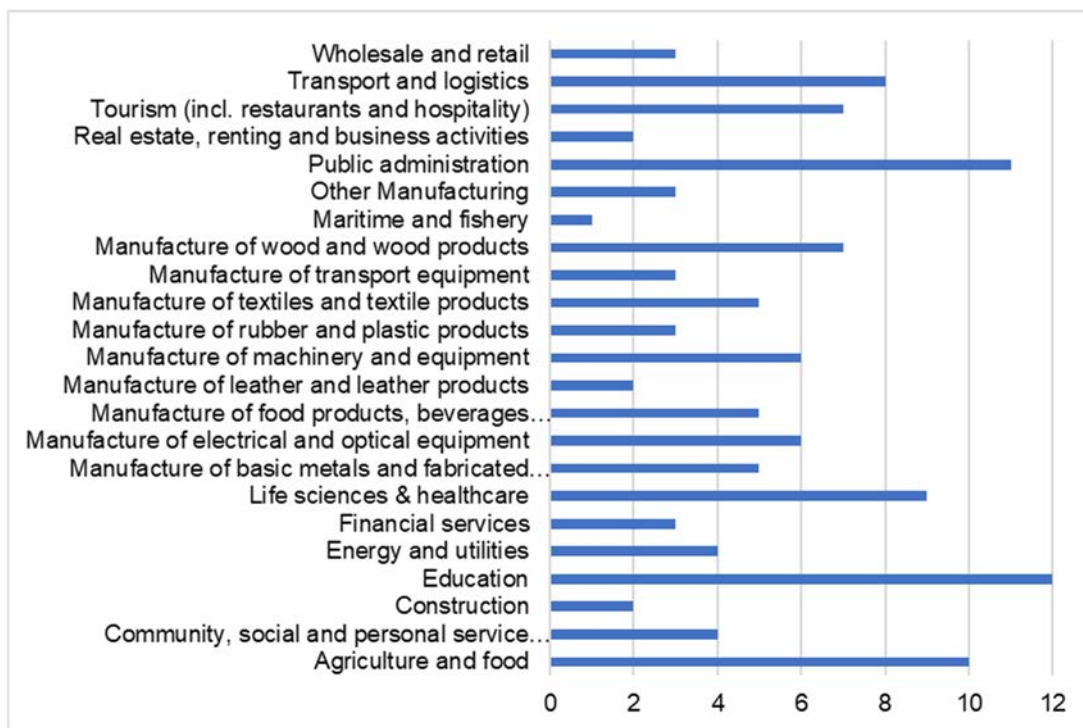


Figure 5. Sectors covered by the Romanian DIHs Source: S3P, database processed by the authors

Table 2. TRL - Romanian DIHs

DIHs name	TRL1	TRL2	TRL3	TRL4	TRL5	TRL6	TRL7	TRL8	TRL9
BEIA DIH				x	x	x	x	x	x
CiTyInnoHub	x	x	x	x	x	x	x	x	x
Cluj IT Cluster					x	x	x	x	x
Danube Digital Innovation Hub					x				
Digital Innovation Hub for Society (DIH4S)	x	x	x	x	x	x	x		
Digital Innovation SMART eHUB	x	x	x	x	x	x	x	x	x
DIH West Region Romania		x	x	x	x	x	x	x	x
Futures of Innovation and Technology					x	x	x	x	x
North-East Romania - Digital Innovation Zone	x	x	x	x	x	x	x		
RO Tech Nation DIH	x	x	x	x	x	x			
Sibiu Smart Systems		x	x	x	x				
Transilvania Digital Innovation Hub - DIH	x	x	x	x	x	x	x	x	
Universitatea de Vest of Timisoara									
Universitatea Lucian Blaga of Sibiu									
Wallachia eHub	x	x	x	x	x	x	x	x	x

Source: S3P, database processed by the authors

The data in table 3 also indicates that the services associated with the commercial infrastructure are not covered by the Romanian DIHs, while the pre-competitive series production, voice of the customer services, the product consortium services have poor coverage.

Conclusions

After the review of the scientific literature - that revealed the lack of knowledge regarding the particularities of the Romanian DIHs - the research, conducted by the authors, focused on mapping the DIHs in the EU and Romania.

Table 3. Services provided by Romanian DIHs

DIHs name	Services															
	Af&i	Ac	Cr	Ci	Cvp	Dma	Ec	Ed	Is	Mi	M	O	PcS	TV	VSbD	Vc
BEIA DIH	x	x	x				x	x	x	x	x			x	x	x
CiTylInnoHub	x	x				x	x	x	x		x			x	x	
Cluj IT Cluster	x		x		x		x	x			x			x	x	
Danube Digital Innovation Hub		x	x					x	x		x			x		
Digital Innovation Hub for Society	x	x	x		x	x	x	x							x	
Digital Innovation SMART eHUB	x	x	x		x	x	x	x	x	x	x			x	x	x
DIH West Region Romania		x	x			x	x	x			x				x	
Futures of Innov. and Technol.	x	x	x		x	x	x	x	x		x		x	x	x	
North-East Romania – DI Zone		x	x		x		x	x	x		x			x	x	
RO Tech Nation DIH		x	x		x		x	x	x		x			x	x	
Sibiu Smart Systems		x	x		x		x	x				x		x		
Transilvania DIH		x	x		x		x	x	x			x		x		
Univ. de Vest of Timisoara																
Univ. Lucian Blaga of Sibiu																
Wallachia eHub	x	x	x		x	x	x	x	x	x	x				x	

Source: S3P, database processed by the authors

The comparative analysis reported the following:

- the number of DIHs registered in Romania (15) is well below the EU average (23); this is a weak point for Romania; in other words, the Romanian business environment does not have the same support (as EU SMEs) to facilitate their digital transition;
- in EU, the fully operational DIHs are 60% of the total DIHs; in Romania, fully operational DIHs represent 67% of the total, which is a favorable aspect;
- only two Romanian DIHs managed to access funds from H2020; the EU average is 4 DIHs per EU member state; in order to increase the access to H2020 funding and to provide more services to the business environment, Romanian DIHs must pay attention to the eligibility criteria established for accessing funds;
- Romania has 12 candidate DIHs for European recognition, which places it very close to the EU average; strengthening the DIHs infrastructure creates access to consistent support for SMEs in the digital transition.

The analysis at the Romanian DIHs allowed the formulation of the following conclusions:

- out of the 15 Romanian DIHs, 10 are fully operational, 3 are in preparation and 2 are potential DIHs from H2020;
- these DIHs cover only 6 of the 7 development regions;
- only 1 DIH has a turnover of more than 5 million euro; this DIH has in its portfolio only 9 of the 16 possible services; other DIHs, which provide more services, had lower turnovers; the new DIHs that will be registered in Romania must keep in mind that the number of services they offer is not a guarantee of success; more important is the adequacy of the portfolio to the needs of customers (mostly SMEs);
- only four DIHs have more than 50 customers per year; these do not include the DIH with the highest turnover, which stated that it has between 11 and 25 customers per year;
- existing DIHs mainly cover three sectors: education, public administration and agriculture; 20 sectors are partially covered; 13 sectors remain uncovered; in order to facilitate the digital transition for SMEs in all sectors, the new DIHs to be registered in Romania must take these aspects into account;

- only 3 Romanian DIHs have all 9 TRL stages; in order to identify new market sectors, the new Romanian DIHs must adjust their offer taking into account the needs of SMEs, but also the technological maturity of existing DIHs.

Limitations and future research

The present study was based on a quantitative analysis that used secondary data. In future research we have in mind a qualitative analysis (based on primary data) that would allow the creation of a complete profile of the Romanian DIHs from the perspective of the legal representatives of these business associative structures.

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DIGITAL TRANSITION, DIGITAL INNOVATION HUBS AND ECONOMIC DEVELOPMENT – AN EU CASE STUDY

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Abstract

Purpose – The study maps EU-wide Digital Innovation Hubs (DIHs) and assesses the contribution of digitalisation to member states' economic development.

Methodology/approach - To provide an overview of EU DIHs, we analysed data from the European Commission's Smart Specialisation Platform (S3P). An econometric analysis was based on cross-sectional data and regression models. To assess the extent to which digitalisation produces economic and social effects, we opted for an aggregate indicator of macroeconomic outcomes with independent variables from the Digital Economy and Society Index (DESI).

Findings – More than half of the change in GDP per capita is explained by the change in the analysed variables: electronic information sharing, social media, e-commerce and selling online cross-border, driven by digitally transitioned EU SMEs.

Research limitations/implications – Empirical research was conducted on EU member states and in the Covid-19 pandemic period of 2019-2021. Future research could consider relative country size and relative economic power as additional variables.

Practical implications – By leveraging the results of the study, decision makers can better understand the benefits of supporting SMEs in the adoption of digital solutions and leveraging DIHs impact.

Originality/value – Research results provide valuable contributions towards the improvement of SME performance in EU.

Key words: digital transformation, SME, digital innovation hubs.

Introduction

Recent studies (e.g., Borowiecki et al., 2021) have signalled an increase of the global digital economy, which is considered to be an important pillar for economic growth of individual nations. Globally it is estimated that by 2025, the digital economy will account for over 15% of the national gross domestic product (GDP) (World Bank, 2022).

The "Digital Europe Programme" aims to strengthen the international competitiveness of member states and, implicitly, of the European Union (European Commission, 2022a). The digital transition of EU nations has been embedded in concerns about the resilience of member states' economies, which have been impacted by the Covid-19 pandemic crisis (Georgescu et al., 2022). An important role is given to DIHs (Georgescu et al., 2021), which were created to facilitate access to innovative digital solutions for all economic and social actors.

The strong impact of digitalisation (especially in the last decade) had the effect of changing perceptions of value creation and the use of technology (Peter et al., 2020; Sassanelli et al., 2021). Studies have shown that digitalisation is changing the profile, needs and behaviour of consumers (Teece, 2010). To maintain and improve their competitiveness, organisations need to adopt business models that allow them to adapt to consumer needs, increase opportunities for innovation, increase productivity, reduce costs, and develop sustainably (Kraft et al., 2022).

For a digital transition, DIHs and the assessment of the contribution of digitalisation to economic development are concepts that have not yet been researched to a great extent. This study fills a research gap by addressing two interrelated research issues: a) the extent to which DIHs have been established (and planned) to support the digital transition (in the Covid-19 pandemic and post-pandemic periods); and b) the extent to which digital innovation has contributed to EU member states' economic growth. In order to answer the identified research problems, we mapped the establishment and development of DIHs in the period 2019-2021 and conducted an econometric analysis to assess the contribution of digitalisation to economic development.

Literature Review

Digital transformation is defined as the strategic change associated with the application of digital technologies to businesses and governments, based on new consumer needs and market changes (Peter et al., 2020; Prince, 2018). Digital transformation is an ongoing process that forces and supports all actors in an economy, including small and medium-sized enterprises (SMEs), large corporations but also associative and non-associative business structures to reflect paradigms and improve business models according to new market requirements (Georgescu et al., 2022).

The increase of digital performance in the EU economy resulted to some degree in the improvement of productivity and increasing importance of collaborative networks (Baranauskas & Raišiene, 2022; Jurcevic et al., 2020). Also, it is assumed that the accelerated digitalisation of the economy in the last two years following the Covid-19 outbreak was an important argument for the transition from traditional business models to business models with integrated digital platforms. However, several challenges emerge associated with the ongoing digitalisation, including sustainable management (e.g., vulnerabilities in collaborative networks and an increased asymmetry of information on digital resources).

In 2021, there were approximately 22.6 million SMEs registered in the European Union, representing 99% of all businesses in the EU (European Commission, 2022b). DIHs play an important role in facilitating the digital transition, focusing on providing support to SMEs, considered to be important actors in the EU economy (Georgescu et al., 2021). According to the results of previous studies, SMEs are constantly concerned with boosting productivity and increasing competitiveness (Viswanathana & Telukdari, 2021). Compared to traditional SMEs, digitally connected ones can generate more value, especially from international transactions (WTO, 2019). Also, SMEs with a lower level of digital maturity are more interested in applying collaborative projects, precisely to enhance the benefits of innovation and for faster digitalisation (Volpe et al., 2021). Hence, with ongoing digital transformation and digitalisation, and new challenges emerging, DIHs might contribute to economic growth at levels underestimated by stakeholders.

Methodology

To assess the extent to which DIHs were established to support the digital transition, we conducted an analysis based on data available on the S3P (European Commission, 2022c). The 27 EU member states maintain a total of 625 registered DIHs, an average of 23 DIHs per EU member state. There are major differences between member states, primarily driven by country and economic size (Table 1).

For example, Spain is the country with the highest number of registered DIHs (90), while Malta has the lowest number of DIHs (2). Of the total DIHs (Figure 1), only 60% are fully operational, 31% are in preparation, and 9% are potential DIHs from the EU H2020 project. Periodically, the EU launches funding calls and selects new DIHs to be part of the EU DIH network. There were 316 candidate DIHs reported on the Smart Specialisation Platform (S3P). Comparing the total number of registered DIHs at the EU level with the number of candidate DIHs, it is observed that the member states (Italy, Spain, Germany, and France) with the most registered DIHs also have the most candidate DIHs.

As collaborative structures based on the idea of collaboration platforms, DIHs were created to provide support in the digital transition of European SMEs. Therefore, we have chosen to conduct an econometric analysis based on a) the dependent variable of real GDP per capita (GDPc) as a measure of the intensity of economic activity (data was collected from the EUROSTAT databases) (European Commission, 2022b); and b) independent variables (according to the Digital Economy and Society Index (DESI) (European Commission, 2022d), namely Electronic information sharing (% enterprises) (Eis); Social media (% enterprises) (Sm); Big data (% enterprises) (Bd); Cloud (% enterprises) (C); e-Invoices

(% enterprises) (eI); SMEs selling online (% SMEs) (So); e-Commerce turnover (% SME turnover) (eCt); and Selling online cross-border (% SMEs) (Soc).

Table 1. Metrics of EU DIHs

	DIHs				DIH in H2020 Projects		Candidate DIHs
	Total	FO	IP	PDH	FO	IP	
Mean	23,1	13,9	7,1	2,1	2,9	0,9	11,7
Minimum	2	0	1	0	0	0	0
Maximum	90	66	25	8	17	4	45
Sum	625	375	192	58	78	25	316
Count	27	27	27	27	27	27	27

Notes: Total = Total number of DIH; FO – Fully Operational; IP – In Preparation; PDH - Potential from H2020 (based on data from European Commission, 2022c).

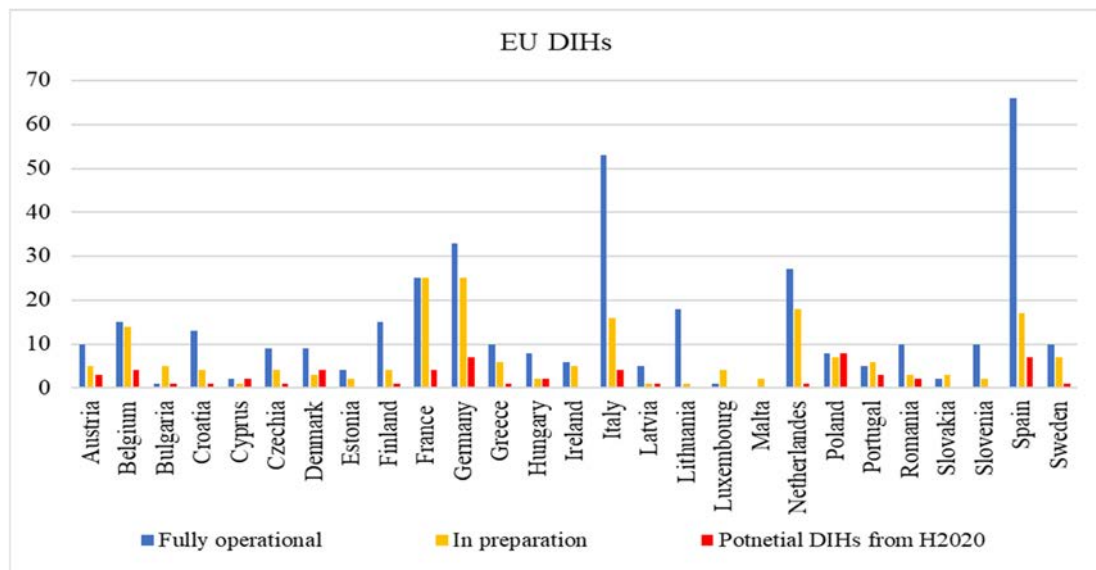


Figure 1. DIHs by Nation and Type (based on data from European Commission, 2022b)

Based on the literature, our hypothesis was that an increase of the degree of digitalisation in the economies of the EU member states has beneficial influences on macroeconomic outcomes. The analysis period was limited to three years (2019 to 2021), precisely to capture the influences of the pandemic period in which SMEs were forced to use digital technology to overcome specific challenges. In order to assess the relationship between the degree of digitalisation and the dynamics of EU member states' economies, correlation and regression analyses were performed. The data analysis package from Microsoft Excel was used for data processing.

Results

The first step of the econometric analysis was to summarise in a synthetic and explicit form the database and to test the representativeness of the data set. The descriptive statistics are presented in Table 2.

For the analysed variables, the standard deviation indicates a degree of data scattering below the mean values at the sample level. The Kurtosis index is in the range (-1; 3), which indicates that the sample values are close to average (predominantly lower than average). The Skewness index has values close to zero which indicates a symmetrical distribution to the left (in the case of Eis), and to the right (in the case of the other variables). From the average point of view, minimum and maximum values, the data offers the following interpretation:

Table 2. Descriptive statistics- EU SME Performance 2019-2021 based on GDP and DESI Factors

	<i>Eis</i>	<i>Sm</i>	<i>Bd</i>	<i>C</i>	<i>el</i>	<i>So</i>	<i>eCt</i>	<i>Soc</i>	<i>GDPc</i>
Mean	35,17	23,86	12,90	22,81	26,31	18,22	11,49	8,95	27508,89
Standard Deviation	9,36	9,99	6,13	13,88	18,98	7,52	5,11	3,63	17771,64
Kurtosis	-0,48	-0,70	-0,08	0,27	2,81	-0,42	2,10	-0,17	2,45
Skewness	-0,03	0,50	0,84	1,06	1,77	0,62	0,95	0,51	1,53
Minimum	14,00	8,00	5,00	6,00	7,00	6,00	2,00	2,00	6380,00
Maximum	54,00	44,00	31,00	62,00	95,00	38,00	29,00	18,00	86550,00
Count	81	81	81	81	81	81	81	81	81

- On average, 35.17% of EU SMEs, during the Covid-19 pandemic period, were able to continue their activity using electronic information sharing platforms (EIS). The minimum value of this indicator was recorded by Hungary (throughout the analysed period), and the maximum value was recorded in Belgium (in 2019).
- On average, 23.86% of SMEs are active on social media (Sm). Finland is the country where SMEs make the most use of social networks (44%). At the opposite side is Romania, where only 8% of SMEs are active on social media platforms.
- Only 12.90% of SMEs manage and capitalise on large and complex data sets (Bd) (which require appropriate software). The exploitation of these data sets is more intense in Malta (where 31% of companies have software and process large data sets). The lowest utilisation rates were identified in Romania and Cyprus (5%).
- On average, 22.81% of EU SMEs use Cloud (C) for data storage and processing. Cloud services are highly valued in Finland (62% of businesses store data in the Cloud), but only 6% of Bulgarian SMEs use Cloud platforms and services.
- On average, 26.31% of SMEs issue electronic invoices (el). In Italy, 95% of businesses use electronic invoices. At the opposite pole is Latvia, where only 7 out of 100 SMEs issue electronic invoices.
- At EU level, only 18.22% of SMEs have online sales (So). Most companies that have online sales are in Denmark (38%). At the opposite side is Bulgaria, which at least recorded modest increases (from 6% in 2019 to 8% in 2021).
- On average, at EU level, 11.49% of total sales in SMEs are made on e-commerce platforms (eCt). Ireland is the country with the largest share of e-commerce in total sales (29%). In Bulgaria, less than 3% of total sales are made through e-commerce.
- On average, only 8.95% of EU SMEs make cross-border online sales (Soc). Ireland is leading in this respect (18%). At the opposite side is Romania, where only two out of 100 companies make cross-border online sales.
- Real GDP per capita (GDPc) records average values of 27,509 euros (at sample and period level). The minimum value of the indicator was recorded in Bulgaria (6,380 euros in 2020) and the maximum value was recorded in Luxembourg (86,550 euros in 2021).

The correlation analysis at the level of the variables in the sample was the second step of the econometric analysis. The results (shown in Table 3) indicate that there is a positive correlation (over 0.75) between two independent variables (So and eCt).

In order to eliminate the risks related to the correlated data, we ran two regression models that would capitalise on the information provided by the two variables, but in different regression equations. The first equation excludes eCt, and the second excludes So (see Table 4). The statistical confidence assumed for the regression analysis was 95%, and the assumed significance threshold was 0.05. For both equations, the significance presents values lower than the assumed significance threshold, the models being considered statistically valid. Adjusted R Square is 55% in the first model and 58% in the second model, which indicates that more than half of the GDP per capita change is justified by the variation of the variables included in the analysis.

Table 3. Correlation Analysis

	<i>Eis</i>	<i>Sm</i>	<i>Bd</i>	<i>C</i>	<i>el</i>	<i>So</i>	<i>eCt</i>	<i>Soc</i>	<i>GDPc</i>
<i>Eis</i>	1								
<i>Sm</i>	0,47	1							
<i>Bd</i>	0,45	0,60	1						
<i>C</i>	0,38	0,67	0,62	1					
<i>el</i>	0,26	0,29	0,20	0,63	1				
<i>So</i>	0,36	0,55	0,45	0,64	0,27	1			
<i>eCt</i>	0,23	0,41	0,39	0,52	0,20	0,79	1		
<i>Soc</i>	0,38	0,54	0,34	0,39	0,05	0,70	0,67	1	
<i>GDPc</i>	0,53	0,70	0,56	0,56	0,28	0,45	0,53	0,52	1

Table 4. Regression Analysis

First equation	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	8,57	0,19	44,96	0,00	8,19	8,95
<i>Eis</i>	0,01	0,01	1,98	0,05	0,00	0,02
<i>Sm</i>	0,02	0,01	3,16	0,00	0,01	0,04
<i>Bd</i>	0,02	0,01	1,58	0,12	0,00	0,04
<i>C</i>	0,00	0,01	0,58	0,56	-0,01	0,02
<i>el</i>	0,00	0,00	0,63	0,53	0,00	0,01
<i>So</i>	-0,01	0,01	-1,38	0,17	-0,03	0,01
<i>Soc</i>	0,05	0,02	2,40	0,02	0,01	0,08
R Square = 0,59		Adjusted R Square =0,55		Significance F =5,39x10 ¹²		
Second equation	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	8,396	0,19	44,71	0,00	8,02	8,77
<i>Eis</i>	0,01	0,01	2,36	0,02	0,00	0,02
<i>Sm</i>	0,03	0,01	3,85	0,00	0,01	0,04
<i>Bd</i>	0,01	0,01	1,31	0,20	-0,01	0,03
<i>C</i>	-0,01	0,01	-0,76	0,45	-0,02	0,01
<i>el</i>	0,00	0,00	0,81	0,42	0,00	0,01
<i>Soc</i>	0,00	0,02	0,00	1,00	-0,04	0,04
<i>eCt</i>	0,03	0,01	2,67	0,01	0,01	0,06
R Square = 0,6172		Adjusted R Square = 0,58		Significance F =5,06x10 ¹³		

The regression analysis also indicates that four variables (*Eis*, *Sm*, *Soc* and *eCt*) have a statistically positive and significant influence on GDP per capita; in other words, a one percent increase in SMEs that use electronic data sharing, those that are active on social media and those that have cross-border sales have the positive effect of increasing a nation's GDP per capita; rather, as the share of online sales in total turnover increases, the prospects for GDP growth per capita increase; and finally, the free term is statistically significant, which indicates that there are (of course) other variables influencing GDP per capita.

Discussion and Conclusion

At the EU economic level, the predominant economic agents in terms of units are SMEs. Against the background of the Covid-19 pandemic, there has been a growing concern of national and European authorities to support SMEs in support of their digital transition. In this context, an important role is assigned to DIHs, which provide products and services tailored to the business community they support. Studies have shown that digitalisation and innovation support SMEs in overcoming crisis-induced barriers (economic, financial, pandemic), increasing the resilience and sustainability of economies.

This study assesses the extent to which businesses have leveraged the results of digital innovation during the Covid-19 pandemic crisis. The results of the study show that, at the EU level, the degree of involvement of SMEs in electronic data sharing and social media has increased. At the same time, the SMEs' interest for the use of big data, cloud platforms and electronic invoicing has increased. More dominant is the increase in online sales (domestic and cross-border) as well as the increase in the share of e-sales revenue in total sales revenue. These transformations have had an impact on the macroeconomic outcomes at EU level. Econometric research has shown that one percent increase in businesses that (a) share information electronically, (b) are active on social media/have digital marketing activity, and (c) have cross-border sales, contribute to an increase in GDP per capita as follows: (a) 0.01; (b) 0.02-0.03; (c) 0.05. As the share of online sales in total sales increases, GDP per capita increases by 0.03.

Our results are convergent with other results of previous studies. For example, Kovács et al. (2022) investigated whether the DESI variables contribute to increasing convergence at EU member state level. Using real GDP per capita as a criteria for grouping EU countries, the authors identified a so-called "Matthew effect" (e.g., Perc, 2014), that describes the "rich get richer" phenomenon. In other words, the authors confirmed the contribution of DESI variables to the increase of convergence and implicitly to the increase of GDP per capita, but with more consistent effects at the level of the developed countries. This effect is also confirmed by our analyses which showed that the developed EU countries (such as Spain, Italy, Germany, France, and the Netherlands), that have the most fully operational DIHs, also have the most DIHs candidates to be recognised at EU level. Therefore, the contribution of DIHs to ensuring the digital transition of SMEs in these countries will be more consistent, and the effects on GDP per capita is assumed to be more obvious.

Other studies have shown that the attention of decision makers on the digital economy has increased. Liu (2022) reviewed data provided by DESI and showed that the best performing economies in the EU are strongly correlated with at least one of the DESI indicators. Other studies that support the contribution of digitalisation to increasing macroeconomic outcomes have been conducted by Grigorescu et al. (2021), Jurcevic et al. (2020), and Stanley et al. (2018), who all analysed the impact of digital transformations on economic and social outcomes.

However, we acknowledge that our research is limited to EU member states and only covers the short Covid-19 pandemic period (2019-2021). In addition, future research might acknowledge country size and economical drivers as an important factor in the analysis. Therefore, the representativeness of the results must be viewed in light of these limitations. As a consequence, we consider a cluster analysis to identify the impact of digitalisation of SMEs by categories of EU member states, grouped according to economic power (estimated by real GDP per capita). In this analysis we also consider the correlation of the intensity of DIH activity with the economic performance of member countries.

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NEW STRUCTURAL EQUATION MODEL FOR ASSESSING YOUTH ADULTS' RESILIENCE

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Abstract

Purpose – this research aims to analyze the resilient level of young adults using statistical techniques and propose a new structural model specific to the studied problem.

Methodology/approach - In order to measure the level of resiliency in participants, the authors used the CD-RISC questionnaire. It was completed by students. Current research statistically analyzes the proposed questionnaire for assessing the level of resilience (concept and dimensions), interprets the research tool, tests the statistical hypotheses suggested by the literature, presents a structural equation model (SEM) and analyzes results.

Findings – the research conducts a qualitative analysis of the concept of resilience, assessing resilience using a SEM and identification of the main indicators of resilience.

Research limitations/implications – the structural model of resilience is specific to the analyzed data obtained on the sample of respondents, but the methodology for obtaining this model is generally valid for quantitative analyzes based on the questionnaire.

Practical implications – The authors propose quantitative research for assessing the degree of resilience among young adults. Conclusions are issued, and solutions are proposed to reduce the negative effects of the COVID-19 period.

Originality/value – proposes the questionnaire, implements the research tools, tests the statistical hypotheses proposed by the literature, proposes the SEM.

Key words: Youth adults' resilience, Statistical analysis, Structural Equation Model.

Introduction

Researches indicate that resilience has many benefits (Hart, Wilson, & Hittner, 2006), is associated with a wide variety of risks and protective factors (Hemenover, 2003; McAdam-Crisp, 2006) and incites the interest of specialists (Smith & Carlson, 1997; White et al., 2008).

Resilience also needs to be approached complexly and specifically, as individuals can be resilient to certain aspects of life that others are not, manifesting themselves gradually (Hjemdal, 2007; Rutter, 2007). Adult resilience studies also involved populations that were perceived to be at risk, mainly due to illness or stressful experiences (Kobasa, 1979), but proved to be limited to generalization (Friborg, Barlaug, Martinussen, Roseninge and Hjemdal, 2005). Research on the resilience of adults (Reich, Zautra and Hall, 2010), has highlighted cases in which recovery occurs after an event with traumatic aspects, but also people in whom behavioural disorders have begun to develop against the background of traumatic events. Some authors Taylor (1983), who also mention the positive consequences of trauma, and Tedeschi and Calhoun (1995) identify several effects: the person appreciates each day more, develops beneficial relationships with family and friends, and changes their priorities.

The concept of resilience is a continuous dynamic determined by the following aspects:

1. Is resilience viewed from the perspective of the resistance, recovery, and transformation during life (Masten and O'Dougherty, 2010);

2. The contexts in which resilience is studied have become complex;
3. Resilience is seen not only as associated with trauma but from the perspective of situations of chronic adversity (poverty, accidents, unemployment, mental disorders).

In the last two years, researchers demonstrated the essential role of resilience during the COVID-19 pandemic (Chen & Bonanno, 2020; Prime et al., 2020). The individuals involved in social activities tend to be more resilient, although the mean score was lower than before the COVID-19 period. It was indicated that resilience buffers the negative association between the Big Five of neuroticism and COVID-19 stress (Zager Kocjan et al., 2021). Stability reduces stress and anxiety (Cazan & Truta, 2015) and may predict strategies used by people to react positively to stress. Highly resilient individuals tend to develop more adaptive coping strategies than maladaptive strategies (Denovan & Macaskill, 2017).

Organization of research

The authors of the study used statistical methods to identify the characteristics of young adults regarding their resilience in post COVID – 19 era.

The main objective of the research is the analysis of the level of resilience in young adults and the realization of a structure for this characteristic. To achieve this objective, the following theories are followed:

- The resilience characteristic at the population level underwent changes after the pandemic period, both from the point of view of the determining factors and at the level of the measured value.
- There is no difference in the resilience structure between the two groups of respondents (M/F)
- Building a structural model for the resilience characteristic adapted to the level of young adults

Material and method

The current research wants to operationalize the variable of psychological resilience on a group of students in the 1st and 2nd years of TUIASI after the pandemic period. The methodology includes the following steps:

1. Using a professional questionnaire to assess psychological resilience

In order to measure the level of trait resiliency in participants, the authors used the CD-RISC, the suggested self-report scale for measuring trait resiliency (Connor & Davidson, 2003). The CD-RISC contains 25 items with a 5-point range of responses as follows: not true at all (0), rarely true (1), sometimes true (2), often true (3), and true nearly all of the time (4). The total score ranges from 0 to 100, with higher scores reflecting greater resilience. Internal consistency, test-retest reliability, convergent and divergent validity of the scale is reported to be adequate and can easily distinguish between those with greater and lesser resilience (Connor & Davidson, 2003). The scale is structured as follows (5 dimensions):

- Dimension₁ (d1) - personal competence, high standards and tenacity, to which the items correspond: 10, 11, 12, 16, 17, 23, 24, 25;
- Dimension₂ (d2) - confidence in one's intuitions, tolerance to negative effects and invigorating effects of stress, with items: 6, 7, 14, 15, 18, 19, 20;
- Dimension₃ (d3) - positive acceptance of change and trusting relationships, to which the items correspond: 1, 2, 4, 5, 8;
- Dimension₄ (d4) - control, items: 13, 21, 22;
- Dimension₅ (d5) - spiritual influences, items: 3, 9.

2. Fixing the target group for assessing the level of psychological resilience.

The authors invited students enrolled in courses at Gheorghe Asachi Technical University of Iași, Romania, Economical Engineering specialization (n=123) to participate in an online questionnaire. Students who expressed interest were provided with a link to complete the questionnaire. The research using Google Forms was administered from May June 2022, during the post-COVID-19 pandemic

period. Informed consent was obtained virtually on the first page of the online questionnaire. Participation in the study was voluntary, and participants did not receive any compensation. However, the participants were informed regarding the questionnaire contents and the scale, and they were encouraged to use the feedback in case of misunderstands.

3. Refinement of the standard dimensions of the questionnaire on aspects that influence the level of resilience

All five dimensions are divided into the most critical aspects. Finally, the connection is made between the elements and the proposed items.

Table 1. Dimension 1: aspect-item coding

Encoding dimension_aspect_item	Aspect	Questionnaire item
d1_a1_item1	tenacity	10
d1_a1_item2	tenacity	12
d1_a1_item3	tenacity	16
d1_a1_item4	tenacity	24
d1_a2_item1	personal competence	11
d1_a2_item2	personal competence	23
d1_a3_item1	high standards	17
d1_a3_item2	high standards	25

Table 2. Dimension 2: aspect-item coding

Encoding dimension_aspect_item	Aspect	Questionnaire item
d2_a1_item1	positivity	6
d2_a1_item2	positivity	18
d2_a2_item1	trust in your own intuitions	7
d2_a2_item2	trust in your own intuitions	15
d2_a2_item3	trust in your own intuitions	20
d2_a3_item1	tolerance to negative effects	14
d2_a3_item2	tolerance to negative effects	19

Table 3. Dimension 3: aspect-item coding

Encoding dimension_aspect_item	Aspect	Questionnaire item
d3_a1_item1	acceptance of change	1
d3_a1_item2	acceptance of change	4
d3_a1_item3	acceptance of change	5
d3_a1_item4	acceptance of change	8
d3_a2_item1	trust in a relationship	2
d3_a2_item2	trust in a relationship	13

Table 4. Dimension 4: aspect-item coding

Encoding dimension_aspect_item	Aspect	Questionnaire item
d4_a1_item1	self-control	21
d4_a1_item2	self-control	22

Table 5. Dimension 5: aspect-item coding

Encoding dimension_aspect_item	Aspect	Questionnaire item
d5_a1_item1	faith	3
d5_a1_item2	faith	9

4. Validation of the measurement scale on each dimension separately and on the whole questionnaire.

Validation of the questionnaire on the data sets obtained will be done by analyzing the Cronbach's alpha coefficient, applied to each dimension separately and to the entire questionnaire. The analysis environment is SPSS 22. The value of the coefficient must be greater than 0,6 (for studies with a large number of respondents) (Taherdoost, 2020).

5. Checking the normality of each individual item

We applied the Shapiro-Wilk test to evaluate the normality of the value series. Applying the test to the series of items specifies that they are not normally distributed with a probability of 0,95. Because the analytically calculated p-value within the S-W test depends on the size of the series (the larger the size of the series of values, the lower the p-value, and for p-value <0,05, the hypothesis H0 is rejected: the series is normally distributed) the graphic check of normality was done (drawing Q-Q plot graphs for each item) and the z-score check for each individual series, the corroborated results support the fact that the series are not normally distributed and non-parametric tests will be applied for the subsequent statistical evaluation (Das, 2016).

Comparison of the level of resilience in the two groups of respondents (M/F) - to compare the structure of stability in young adults, the non-parametric Mann-Whitney U test for independent samples will be applied (Yonghwan Um, 2016).

Determination of a formative SEM (Structural Equation Model) for the analyzed study. The analysis environment is SmartPLS 3.0 (Kline, 2016).

The proposed conceptual model is a formative one (figure 1) that corresponds to the following relationship: $\sum_j^5 (b_j * \sum_{i=1}^n a_{ji} * aspect_i)$, where

$a_{ji,j=1..5,i=1..n}$ = loadings of the defined aspects that form Factors 1...5

$b_{j,j=1..5}$ = the loadings of the factors for the formation of the construct for the assessment of resilience.

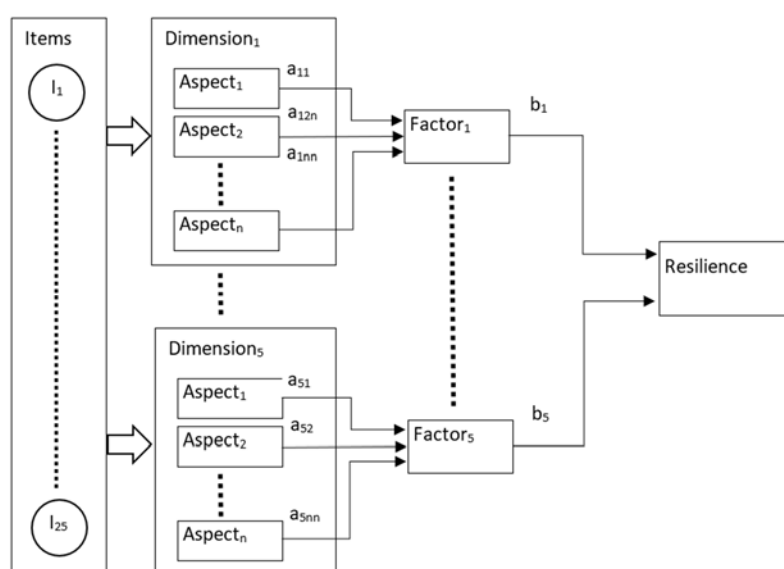


Fig.1 The formative Structural Equation Model

SEM represents a different modelling technique than the classical ones, which exclusively use a regression based on the method of least squares, linear modelling, logistic regression or other types of modelling. SEM represents a conceptual or natural structural environment, which supports the construction of models for different technical, economic, and psychological phenomena. This environment includes calculation theories, factorial analyses, causality analyses, statistical and least squares regressions, and econometric equations. The structural models created in this environment are dynamic, adaptable to the modelled phenomenon, complex, and multivariable, with the main characteristic of being able to correct measurement/observation errors. Another aspect of this structural model is that it systematically analyzes the respective causal models (cause-effect) and the relationships between the dependent and independent variables (it numerically quantifies the links between them). The third characteristic of SEM is the analysis of the indirect (mediation) effects generated by the independent or dependent variables on other variables within the causality systems.

Experimental results

Cronbach's Alpha coefficients for the entire questionnaire and the dimensions that group the 25 items are greater than 0,6, implying a high confidence level for the subsequent statistical analysis (table 6).

Table 6. Data validation

	Cronbach's Alpha	N of Items
All questionnaire	,907	25
Dimension1	,832	8
Dimension2	,689	7
Dimension3	,740	6
Dimension4	,658	2
Dimension5	,672	2

A new variable (resilience) was formed as the sum of the values of the 25 items. The normality of the newly formed series is analyzed. The three normality tests are the SW test (table 7), the graphical Q-Q method (figure 2), and the z-score for skewness and kurtosis (table 8) (Barato, 2015).

Table 7. The S-W test for the distribution of the resilience variable

Shapiro-Wilk test			
Statistic	df	Sig.	
,974	123	,018	

According to the SW test, the series is not normally distributed, being at the limit of the analytical value (Hanusz, 2015).

Table 8. The resilience variable – a descriptive statistic

Descriptive statistical parameters of resilience	Statistic	Std. Error	Z score
Mean	67,2195	1,18897	
Median	67,0000		
Variance	173,878		
Std. Deviation	13,18627		
Minimum	28,00		
Maximum	94,00		
Range	66,00		
Skewness	-,401	,218	-1,83
Kurtosis	,520	,433	1,2

The Z score belongs to the range [-1,96 ;1,96]; thus, the resilience variable can be considered normally distributed (Greggory, 2017).

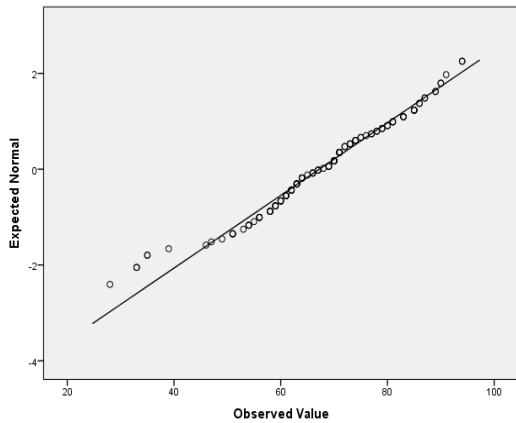


Fig. 2 Q-Q plot for resilience variable

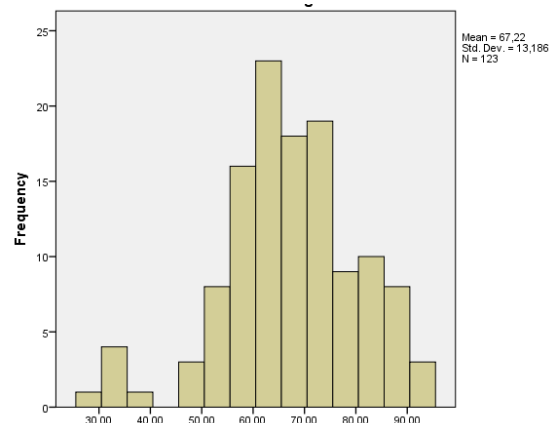


Fig.3 The histogram of the resilience variable

We can consider that the resilience variable is approximately normally distributed.

Observing the resilience histogram for the entire group of respondents (figure 3), we can deduce that the structure of the resilience parameter was not significantly influenced by the Covid-19 pandemic. This can be explained by the fact that the respondents are at the lower limit of maturity, thus being protected within their families.

Another characteristic that shows us the normality of the level of resilience of the respondents is the average value (67.22), close to the lower limit of the interval in which it is considered that the level of resilience is high (70).

The first analyzed hypothesis - if there are differences in resilience between the two groups of respondents (M/F), it results in the fact that the two groups have a structure of the level of resilience approximately the same (figure 4).

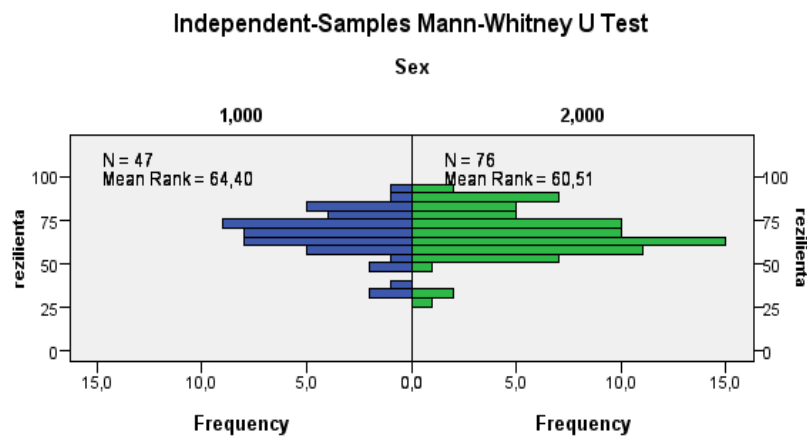


Fig.4 The resilience variable structure (M/F)

The only two differences are d2_a1_item1 – “I can make unpopular or difficult decisions that affect other people, if necessary”, group1 (M) having a mean rank of 72.29 compared to group 2, mean rank = 55.79 (figure 5) and d4_a1_item1 – “When there are no clear solutions for my problems, sometimes fate or God can help me” - the average rank in group 1 is 53.47 compared to 67.28 in group 2 (figure 6).

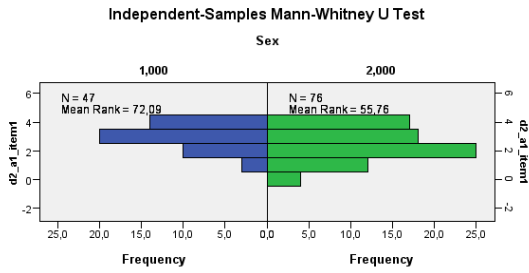


Fig.5 The first different aspect d2_a1_item1

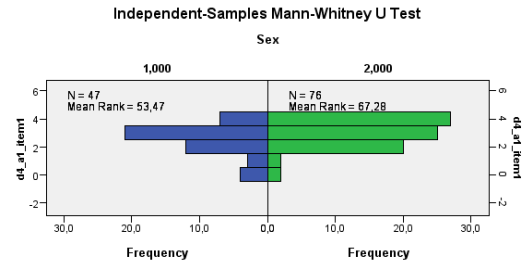


Fig.6 The second different aspect d4_a1_item1

The proposed model for resilience (SEM), programmed in the SmartPLS 3.0 environment, is presented in figure 7.

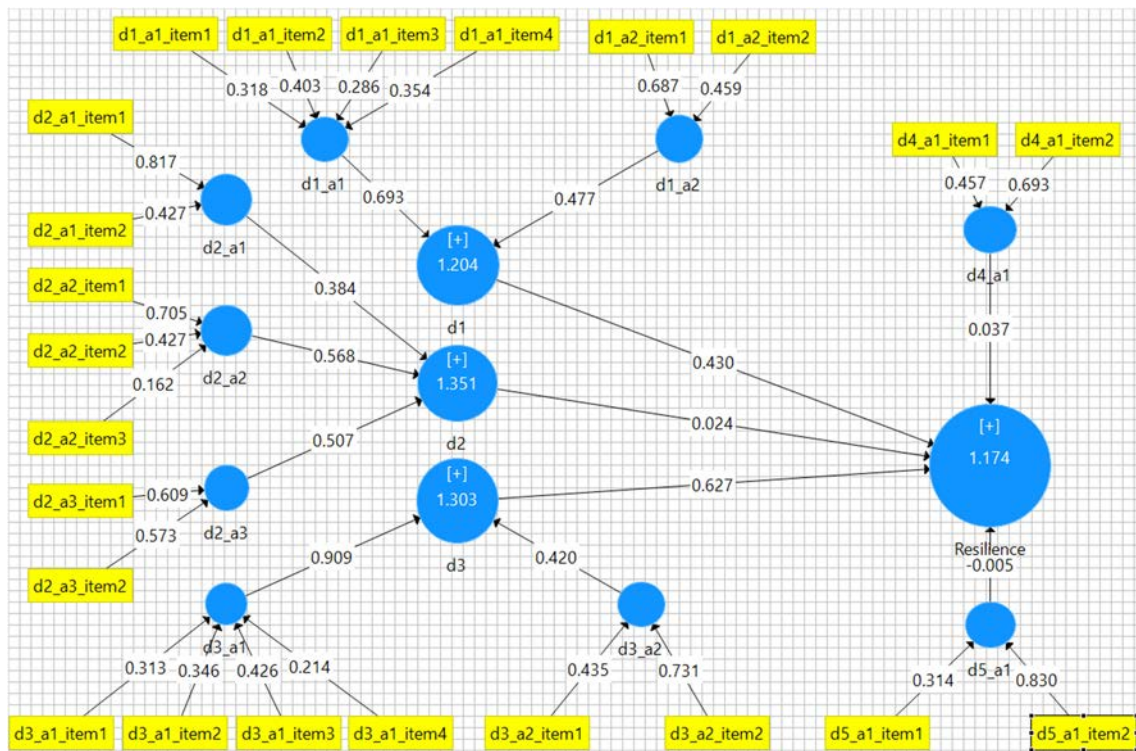


Fig.7 The SEM for youth adults' resilience

It is observed that the most important dimensions that form the resilience construct are dimension d3, with the two aspects "acceptance of change" and "trust in a relationship", with a loading coefficient of 0,627 and dimension d1, with the three aspects (tenacity, personal competence, high standards) with a loading coefficient of 0,43.

Another observation that derives from the built model is the dimension d5 (Faith) that enters the resilience construct with a weighting coefficient of -0,005, which leads to the conclusion that an increased level of faith does not influence the level of resilience in young adults at all.

Even the increased level of the self-control variable (d4) is not seen as a positive factor for the level of resilience (figure 8).

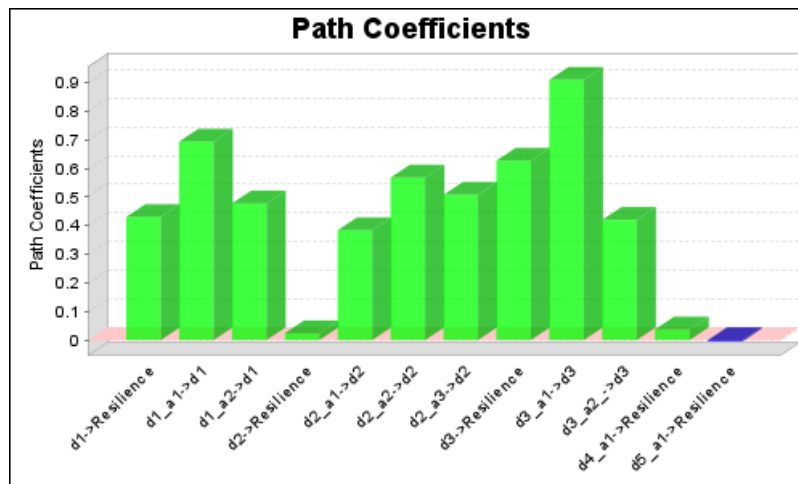


Fig. 8 SEM coefficients

Discussions and conclusions

The proposed model for measuring the level of resilience depends on the moment of application of the questionnaire to the group of respondents, external factors, and the structure of the group of respondents (age, qualification, responsibilities).

The analysis methodology can be applied redundantly to the same group of respondents or another, and the results can be compared.

The paper proposes a statistical methodology for an extremely variable, dynamic, difficult to quantify psychological parameter (resilience level) and implements a structural model based on latent variables.

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A NEW NEURO-FUZZY SYSTEM FOR TECHNICAL DEPENDABILITY ASSESSMENT

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Abstract

Purpose – the research builds a neuro-fuzzy system for technical system dependability assessment.

Methodology/approach – the problem data are obtained by observing the production process. The optimisation problem in operational safety is defined, specifying the input and output variables and the transfer function. We propose a fuzzy model with a neural network to identify the internal rules of the fuzzy system.

Findings – a new concept of dependability analysis of technical systems was formulated. It is subjected to quantitative analysis by implementing a fuzzy hybridised model with a neural classification technique.

Research limitations/implications – the limitation of the research consists in the fact that the generated neuro-fuzzy system is specialised for the technical phenomenon studied. Still, the impact of the research derived from the proposed methodology can be successfully applied in any quantitative analysis from any technical field.

Practical implications – practical importance through the methodology that uses hybrid techniques based on artificial intelligence and fuzzy logic for modelling the dependability function of any technical system.

Originality/value – a new problem in maintenance management with a new transferring function for the discrete optimisation problem. The research builds a new neuro-fuzzy system for modelling a technical system.

Key words: *Neuro-fuzzy system, Maintenance Management, Dependability assessment*

Introduction

The problem of maintenance management is taken from the textile industry in which four parameters are measured - two of production flow (*Production* and *Quality*) and two of maintenance (*Reliability* - through the *MTBF* parameter and *Maintainability* through the *MTTR* parameter). The data collected are from direct observation of the production flow in three textile units containing 28 rolling mills. The observation time is one month, during which the number of defects, the repair time, the production and the quality settings on the machines were observed.

The proposed modelling function is $P=f(M,R,Q)$, so we want to create a model with three inputs and one output. From previous research, the proportional dependence of the production parameter on the reliability parameter is known, and the easy correlation of the production parameter on the maintenance parameter. In the current research, we want to verify these two hypotheses and observe the effect of the quality parameter on the production parameter.

The problem is also present in other research works, being approached independently from the perspective of fuzzy systems (Vilcu et al., 2019), neural modelling (Vilcu et al., 2018), and mathematical modelling (Vilcu et al., 2016), with different modelling functions. The neuro-fuzzy approach is innovative in the area of analysis of the operational management of maintenance.

Neuro-fuzzy systems are viewed as neural networks with supervised learning that use multilayer feed-forward training algorithms. In neuro-fuzzy systems, the loadings of connections between layers and propagation and activation functions differ from classical neural networks (Mahmoud et al., 2015).

A neuro-fuzzy system generally has the following characteristics (Siminski, 2022):

- A neuro-fuzzy system is based on a fuzzy system in which the system of rules is generated by the neural network containing a learning algorithm imported from the theory of neural networks.
- A neuro-fuzzy system can be viewed as a neural network with supervised learning and feed-forward training algorithm with a three-layer structure. The first layer is characterised by the input variables, the inner (hidden) layer represents the fuzzy rules, and the output layer represents the output variables. The fuzzy sets are encoded as loads on the internal connections of the neuro-fuzzy system (figure 1)

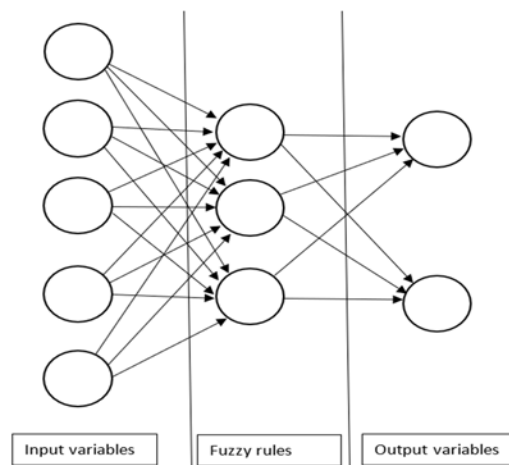


Fig.1. Neuro-fuzzy system with a three layers internal structure

- Combines the positive characteristics of the two types of modelling - Neural networks - they are suitable for pattern recognition (classification) and less good in decision logic and fuzzy systems - they are effective in making decisions. Still, they have a disadvantage in making decision-making rules and especially in the moments when these rules are generated.
- Includes a classic fuzzy system: a fuzzy system is a set of rules (conditional statements) that transform inputs into outputs. A conditional statement is of the form: if x takes the value A , then y takes the value B . $\{x,y\}$ is called linguistic variables, $\{A,B\}$ are called linguistic values in the sets $\{X, Y\}$. Linguistic variable = variable whose values are words or sentences. Linguistic value = value or term that describes a linguistic variable (Al-Mahasneh, 2016).

The neuro-fuzzy system applied in this research combines these two analysis techniques, resulting in a neuro-fuzzy system (NFS). The mechanism underlying such a system is called neuro-fuzzy hybrid system (NFHS) - a neural mechanism that uses training and learning algorithms based on neural networks to determine the parameters of fuzzy systems.

The comparison of the two types of modelling with highlighting the positive elements is presented in table 1.

Table 1. Comparative modelling characteristics (Zheng et al., 2021)

Neural modelling	Fuzzy modelling
It does not require a mathematical transfer function	It does not require a mathematical transfer function
The learning system is permanent	Information about the system and its evolution must be known
There are learning algorithms	The learning system does not exist
It is a black-box type system	Simple implementation

A neuro-fuzzy system has the following architecture (figure 2).

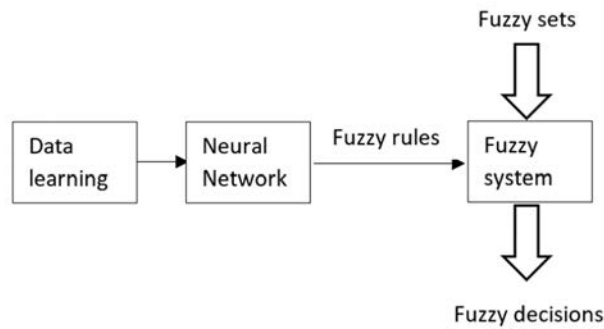


Fig.2 Functional organisation chart of a neuro-fuzzy system

The functional organisational chart of a neuro-fuzzy system is presented in figure 2. It should be emphasised that the neural network works independently of the actual fuzzy system, and the structure of the fuzzy system is automatically generated by the neural network through a supervised learning algorithm (Ruspini et al., 2019).

The fuzzy rules are determined from the training data so that the neural network works independently of the fuzzy system, and the results of the neural network are used to initialise the fuzzy system. Clustering algorithms can be used to obtain fuzzy rules. Thus, the neural network functions as a rule base.

Organisation of research

The work is naturally structured by achieving the following objectives:

1. Choosing the technical phenomenon for the operational analysis of maintenance management. The data were collected by direct observation of 28 rolling mills from 3 textile units, during a month in which the number of stops and repair times were counted, and production and product quality were measured.
2. Formulation of the transfer function of the model proposed for analysis:

$$P = f(R, M, Q)$$

Where:

- R is defined by the parameter $MTBF = \frac{\sum \text{times of good operation}}{\text{number of defects}}$
- M is defined by the parameter $MTTR = \frac{\sum \text{stop times}}{\text{number of stops}}$
- Q is the quality that is given by the specifications on the technological flow
- P is the production value measured at the output of the technical devices

3. Formulation of working hypotheses:

H0: the production parameter is directly proportional to the reliability parameter

H1: the production parameter is easily correlated with the maintainability parameter

H2: the quality parameter has a slight moderating effect in models $P = f_2(R, Q)$ and $P = f_3(M, Q)$.

4. Formation of the neuro-fuzzy system using the Matlab2016a modelling environment, with the data obtained from the technical system organised in 2 groups - one for training (table 2) and another for verification (table 3).

Table 2. Neuro-fuzzy system training data set

MTBF (s)	MTTR (s)	Uster non-uniformity (%)	Production (kg/month)
72133	37004	2,432	8400
74800	40400	2,231	9792
270920	74680	2,122	13908
327718	87002	1,876	15675
119866	39641	2,512	8514
106426	31814	2,478	8820
10472	127768	1,993	1080
280833	64767	1,231	11570
57082	50438	2,498	5431
40771	39869	2,519	4671
50146	106945	2,591	3987
44847	70353	2,449	5144
42466	57487	2,472	5872
40385	54016	2,447	5784
22132	73868	1,721	4215
23915	109008	1,801	3424
38394	59526	1,829	3160
49244	73156	1,649	4445
67257	43143	1,761	8210
62216	48184	1,823	6624
68146	52290	1,699	7308
105177	60423	1,707	11175
118600	77241	1,791	10878

Table 3. Neuro-fuzzy system checking data set

MTBF (s)	MTTR (s)	Uster non-uniformity (%)	Production (kg/month)
111108	66929	1,722	10556
174365	74035	1,459	13488
162790	85610	1,498	13350
450726	46074	1,365	19152
159823	29434	1,521	11531

5. The results obtained by neuro-fuzzy modeling are analysed from the point of view of the researched hypotheses.

Experimental results

The applied procedure is:

1. In Matlab 2016a programming environment: Neuro-Fuzzy Designer application (control panel (figure 3)).

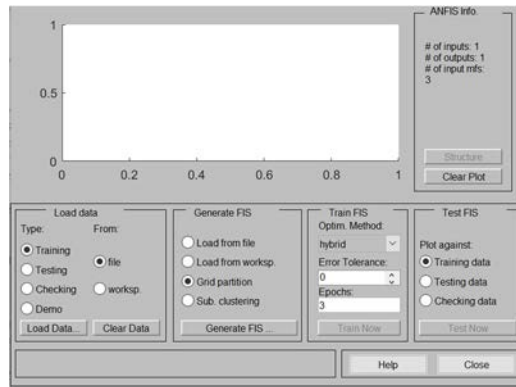


Fig.3 Neuro-fuzzy application control panel

2. Creation of data sets - training (train) and checking (check)

File New script -> copy data from excel (attention: decimal point)

The last series represents the values of the output variable, the first series – the values of the input variables.

3. Load the series in the application (File->Training and File->Checking)
4. The network is generated (Generate FIS) (figure 4)

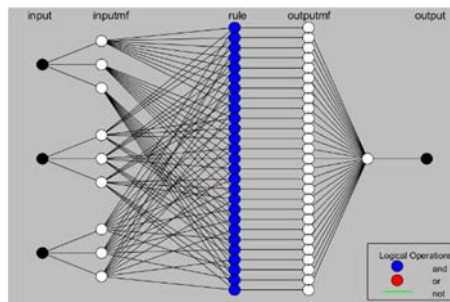


Fig. 4 Neuro-fuzzy system

5. The neural network (NN) is trained by choosing the optimal training method (back-propagation algorithm or hybrid training algorithm) (figure 5).

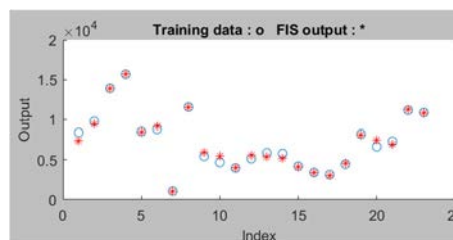


Fig. 5 NN output data compared to training data

6. Checking the network on the test set (figure 6).

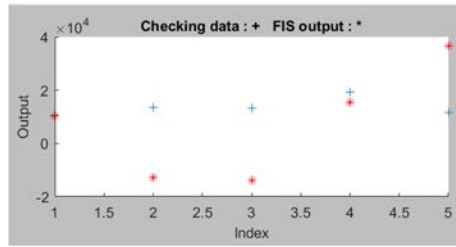


Fig. 6 Verification of the system generated by the NN

7. Load the previously developed model (figure 7) into the fuzzy application from the Matlab environment.

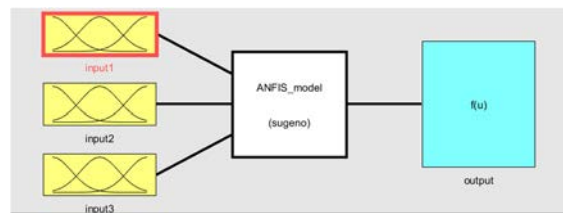


Fig. 7 Fuzzy system with structure generated by NN

The *MTBF* input variable with its membership functions is highlighted in figure 8.

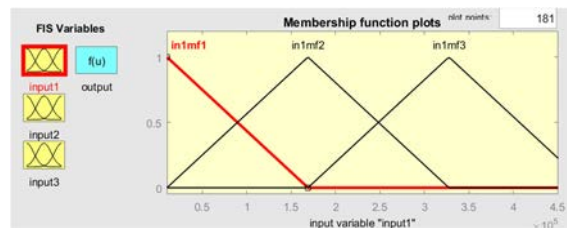


Fig. 8 Membership functions of the Reliability input variable

The *MTTR* input variable with its membership functions is highlighted in figure 9.

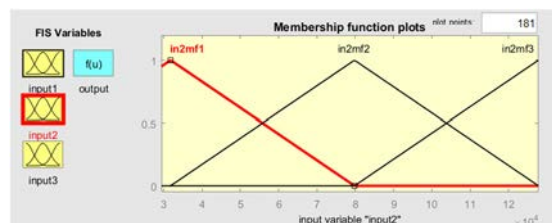


Fig. 9 The membership functions of the input variable Maintainability

The Quality input variable with its membership functions is highlighted in figure 10.

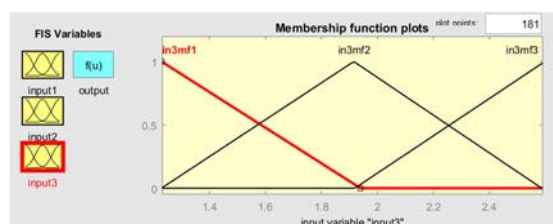


Fig. 10 Membership functions of the Quality input variable

The set of rules automatically generated by the neural network is presented in figure 11 (graphical) and figure 12 (linguistic).

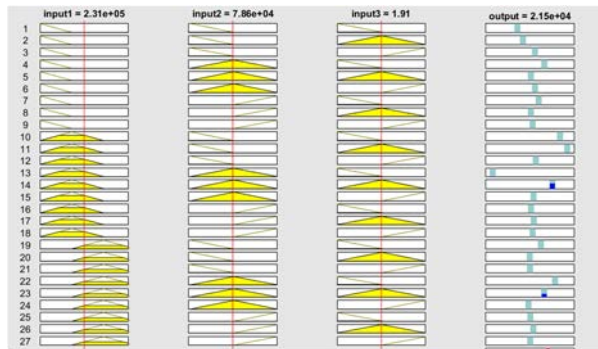


Fig.11 The set of rules given by the membership functions

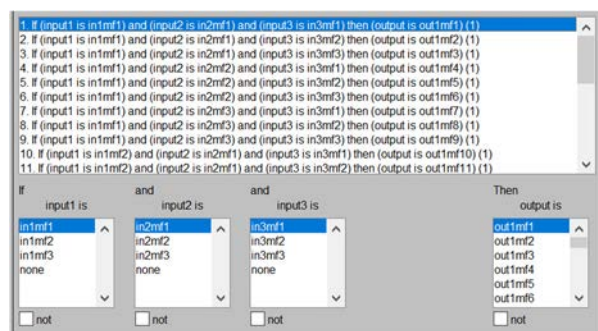


Fig. 12 The set of linguistic rules characterising the internal structure of the fuzzy system

The model automatically proposes a set of 27 rules generated by the algorithm mechanism included in the neural network that initialises the fuzzy system.

Neuro-fuzzy model analysis of the two hypotheses

For modeling $P=f_1(R,M)$ (figure 13)

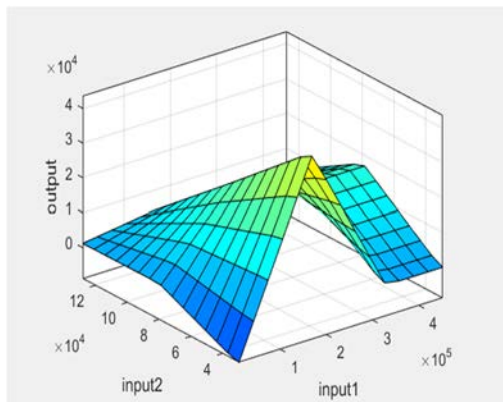


Fig. 13 Model $P=f_1(R,M)$

Explanation of the modelling function - Input1 represents the reliability function of the systems. We notice that with the increase of its value up to a certain threshold of $1,8 \times 10^5$, the value of the product increases proportionally. After this threshold, the production value decreases. The production parameter is proportional to the maintainability parameter over the entire range of values of this input, but the proportionality coefficient is minimal – a large increase in the maintainability parameter corresponds to a slight increase in the output parameter P . The neuro-fuzzy model validates the assumptions.

Determining the effect of the *Quality* variable on *Production*

Model $P=f_2(R, Q)$ (figure14)

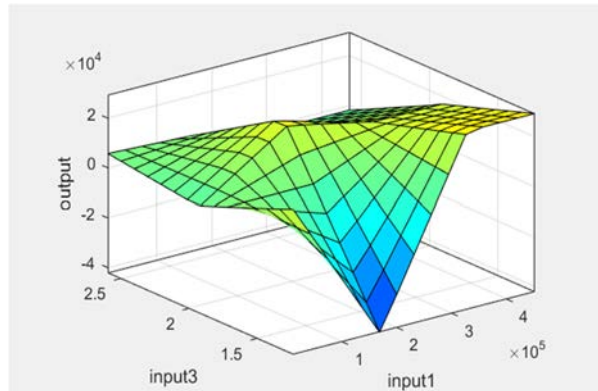


Fig. 14. Model $P=f_2(F, Q)$

In modelling $P=f_2(F, Q)$ it can be seen that the quality parameter (input 3) does not have a determining effect on the production parameter. Thus, the quality parameter can be seen as a moderating parameter of the impact of the reliability parameter on the production parameter (P).

For modeling $P=f_3(M, Q)$ (figure 15).

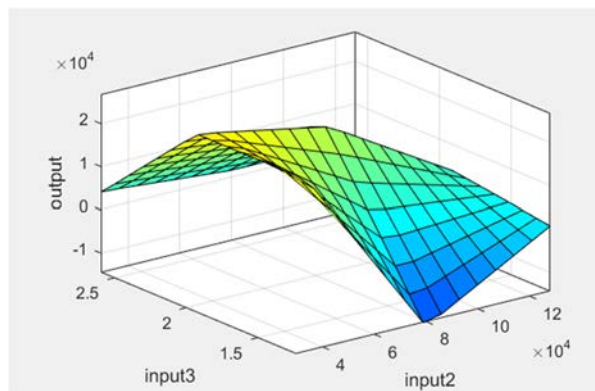


Fig. 15 Model $P=f_3(M, Q)$

The model $P=f_3(M, Q)$ highlights the moderator character of the quality variable (input 3) which influences in a reduced way the effect produced by the maintainability parameter on the output parameter P (output 1). It is observed that there is a threshold value of the maintainability parameter (7.9×10^4) before which the evolution of the production parameter reaches a minimum value.

Discussion and conclusions

The neuro-fuzzy model confirmed the two analysis hypotheses of this research: the *Production* parameter of a maintenance management system is directly proportional to the *Reliability parameter* of the system being analysed; the *Production* parameter is easily correlated with the *Maintainability* parameter.

A second analysis of this research proved the moderating character of the *Quality* parameter on the two models $P=f_2(F, Q)$ and $P=f_3(M, Q)$ without radically influencing the values of the output parameter (P).

As future research wishes, it is the implementation of a neuro-fuzzy system with two outputs parameters for analysis with more complex modelling of the maintenance management phenomenon.

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RADIOGRAPHY OF THE FEMALE ENTREPRENEURIAL ENVIRONMENT IN ROMANIA FROM THE PERSPECTIVE OF BARRIERS AND SOCIAL AND GOVERNMENTAL SUPPORT

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Abstract

Purpose – *The study aims to make a radiography of the female entrepreneurial environment in Romania taking into account on the one hand the barriers faced by women entrepreneurs, and on the other hand the adequate support provided by society and authorities.*

Methodology/approach – *In order to identify the perception of women entrepreneurs in Romania regarding the entrepreneurial environment, we used empirical research based on the survey method, and the questionnaire as a working tool.*

Findings – *The favorable basic element that characterizes the female entrepreneurial environment in Romania is represented by the existence of an equality of gender opportunities and at the opposite pole is the acces to financing sources.*

Research limitations/implications - *The most important limitation of this study is the sampling method and its size. It would be interesting to extend the study at European or global level.*

Practical implications – *The identification of barriers is the basis of solutions that can come from the government or civil society*

Originality/value – *Analysis of the barriers compared to the support from civil society and the government from Romania.*

Key words: *entrepreneurship, government support, civil society.*

Introduction

Female entrepreneurship is an important factor for the economic development of a state. However, the Mastercard Index of Women Entrepreneurs 2018 shows that the number of women entrepreneurs is not always linked to the wealth and economic development of states' economies as a high rate of women entrepreneurs is registered in less rich markets.

The cause of this situation comes from the need to survive. This situation includes states such as Ghana, Uganda, Bangladesh and Vietnam.

In developed countries (New Zealand, Sweden, Canada, the United States, Belgium) women create businesses because of existing opportunities. In these countries, women tend to have access to greater resources and receive support to continue their entrepreneurial project.

In order to achieve real economic development, it is not only the number of women entrepreneurs that matters, but it is necessary for the businesses built by women to survive, to have a favorable environment for women entrepreneurs.

The basis for creating a favorable environment for women entrepreneurs is the attitude towards working women and gender equality, aspects which affects the economic participation of women and entrepreneurship everywhere.

At the level of the Romanian state, there is a satisfactory equality between women and men, as shown in the report Female Entrepreneurship Index in 2015, which states that the indicator with the highest score has equal rights between women and men. From then until now the situation has remained constant.

According to the MASTERCARD INDEX OF WOMEN ENTREPRENEURS 2021 90 percent of women who lost jobs during COVID-19 did not return to work, 64 percent of women -led firms have been strongly impacted by the pandemic and 80 percent of women- owned businesses with credit needs are either unserved or underserved.

In addition, it is shown in the Mastercard Index that women entrepreneurs represent 37 percent of global GDP and have been more severely affected by the pandemic and face continued barriers to reaching their full potential. COVID-19 has had a negative effect on women, adding another 36 years to the estimated time it will take to close the global gender gap on economic, opportunity, education, political power and health.

Index-ul 2021 ranks Romania among the countries where women's advancement tends to be hampered by less supportive entrepreneurial conditions (Romania ranks 44th out of 65 countries)

Global economic recovery depends on investing in women entrepreneurs it is an integrated declaration at the global, european and national level. This requires a specific approach to the subject from a diverse perspective. We propose the approach based on three key points: specific barriers - governmental support and civic support.

Barriers to the development of a business by women entrepreneurs

The obstacles that women entrepreneurs face can be grouped as follows: economic barriers, contextual barriers and software barriers.

Economic barriers are related to the fact that women entrepreneurs find it more difficult to access sources of funding compared to men. This situation is even more evident in the science and technology sector, as this sector most often requires substantial investment.

Contextual obstacles refer to women's educational choices, technology, science and inventions.

Software barriers are related to the lack of access to the right networks. These also include the lack of necessary entrepreneurial skills, such as confidence, assertiveness and risk-taking, as well as the lack of models to send a positive message to women entrepreneurs.

Financial support from the government, especially in terms of start-up capital, is an important factor in motivating women to set up their own businesses.

Financing is one of the most important and difficult challenges for setting up, running, innovating, expanding and developing a business. This obstacle stems from a lack of investor confidence, as women-run businesses are perceived as risky, making it more difficult for women entrepreneurs to obtain financing.

There is no unitary view of the gap mechanism. Various explanations have been put forward to explain this situation, one of which is that the variations observed between women and men are the direct result of the biased behavior of investors who choose to provide capital disproportionately and rather to male entrepreneurs.

Another explanation argues that the gender difference in how capital is allocated is caused by the behavior of women entrepreneurs who seek and therefore receive less capital for their businesses (Kanze et al., 2018a).

Lately, this situation is explained by the fact that women are more likely to be associated with companies with less capital, less risk tolerance and therefore less desirable for the type of financial capital needed to finance a certain level of growth. (Kanze et al., 2018b)

Results of the study We ask Men to win & Women Not to Lose (Kanze et al., 2018c) reveal an important distinction in the types of questions of investors addressed to entrepreneurs, which explain the

disparities in their financing decisions. This distinction places entrepreneurs in two positions: women entrepreneurs as playing not to lose, while male entrepreneurs as playing to win, perpetuating the gender gap.

A possible explanation for the poor performance can be given by social expectations. Women entrepreneurs are expected to play the role of mother or caregiver.

Sources of support

Ensuring gender equality between women and men was an important element for the policies and legislation of the Romanian state.

In Romania there are several institutions involved in gender equality, such as: the National Agency for Equal Opportunities between Women and Men, the National Council Against Discrimination, the National Commission for Equal Opportunities between Women and Men (CONES).

In addition to the theoretical part of entrepreneurship, in Romania by *Order no. 3262/2017 of 16 February 2017*, was intended the organization and functioning of student entrepreneurial societies, called SAS, in order to provide a mechanism to support, develop and encourage entrepreneurship in the university environment, by providing complementary services and assistance in higher education.

Along with government initiatives, civil society became involved in supporting women entrepreneurs to develop and promote female entrepreneurship.

Over time, women in Romania have had access to various programs organized by the European Commission and the government to benefit from funding for their entrepreneurial project.

Research material and method

Participants

The sample consists of 39 women entrepreneurs ($n = 39$), who own businesses in several occupational fields, aged between 18 and over 65 years ($m = 2.85$; $S = .844$). The majority (92.3 percent) of female entrepreneurs run businesses that have less than 9 employees ($m = 1.15$; $S = 0.67$). Most subjects have undergraduate and postgraduate studies ($m = 5.90$; $S = 1.23$).

Research tools

The survey method was used in the research activity and the questionnaire as a working tool. For the purpose of the investigation, which is the object of this research, a questionnaire was developed aimed at conducting an empirical research, to highlight the relevant aspects related to the experience of women entrepreneurs in several cities in Romania.

The pre-testing of the questionnaire was carried out on a sample of 10 subjects, who were not subsequently included in the final sample. Following the pre-test, the necessary changes were made and the questionnaire was drafted in the final form.

Design and specification of the model

The present study is a descriptive, non-experimental, cross-sectional one, which aims to evaluate the entrepreneurial environment of women.

The research is exploratory, quantitative, unrepresentative, without the possibility of extrapolating the results to the entire population.

In order to obtain the data, we used a non-random sampling method, both in the form of snowballs and on the basis of accessibility.

Results

The data were analyzed descriptively, according to the descriptive statistics generated by the Statistical Product and Service Solutions (SPSS) software.

According to the table 1, most subjects (43.6percent) agree that it is a difficult process to start a business in Romania, and 23.1 percent of them totally agree with this statement.

Table 1. Summary of answers to questions. The frequency of response is expressed in the form of numbers (percentage).

	<u>Women entrepreneur</u> n=39
Item description	
Starting a business was a difficult process:	
Total agreement; Agreement; Indifferent; Disagreement; Total disagreement	9(23.1); 17(43.6); 5(12.8); 5(12.8); 3(7.7)
The bureaucratic aspects of running a business are not difficult:	
Total agreement; Agreement; Indifferent; Disagreement; Total disagreement	6(15.4); 7(17.9); 4(10.3); 13(33.3); 9(23.1)
It was difficult to identify a source (s) of funding:	
Total agreement; Agreement; Indifferent; Disagreement; Total disagreement	13(33.3); 18(46.2); 1(2.6); 5(12.8); 2(5.1)
It is difficult to keep the right employees:	
Total agreement; Agreement; Indifferent; Disagreement; Total disagreement	15(38.5); 13(33.3); 4(10.3); 4(10.3); 3(7.7)
Women have the same business opportunities as men:	
Total agreement; Agreement; Indifferent; Disagreement; Total disagreement	11(28.2); 15(38.5); 3(7.7); 7(17.9); 3(7.7)
A woman needs to put in more effort compared to a man when she wants to grow a business:	
Total agreement; Agreement; Indifferent; Disagreement; Total disagreement	6(15.4); 9(23.1); 7(17.9); 11(28.2); 6(15.4)
In Romania, female entrepreneurship is supported and encouraged:	
Total agreement; Agreement; Indifferent; Disagreement; Total disagreement	3(7.7); 11(28.2); 15(38.5); 8(20.5); 2(5.1)
The society offers the same confidence to women entrepreneurs as men entrepreneurs:	
Total agreement; Agreement; Indifferent; Disagreement; Total disagreement	3(7.7); 17(43.6); 9(23.1); 8(20.5); 2(5.1)
Investors are more willing to invest in start-up led by women:	
Total agreement; Agreement; Indifferent; Disagreement; Total disagreement	2(5.1); 6(15.4); 17(43.6); 13(33.3); 1(2.6)
The ambiance of the company's environment perceived by customers:	
Very good; Good; Average; Low; Very low	20(51.3); 18(46.2); 1(2.6); 0(0); 0(0)
The image of the company perceived by customers:	
Very good; Good; Average; Low; Very low	20(51.3); 15(38.5); 4(10.3); 0(0); 0(0)
Do you consider that in Romania, female entrepreneurship benefits from adequate support from the authorities?	
No; Yes; I do not know	9(23.1); 12(30.8); 18(46.2)
Do you consider that professional training is an important factor in the success of a business in female entrepreneurship?	
No; Yes; I do not know	5(12.8); 32(82.1); 2(5.1)
How do you assess the legislative environment in the U.E. relative to female entrepreneurship?	
Very favorable; Favorable; Neutral; Unfavorable; Very unfavorable	1(2.6); 11(28.2); 24(61.5); 1(2.6); 2(5.1)

Regarding the difficulty of the bureaucratic aspects related to the functioning of a business, 56.4 percent of the respondents consider that these aspects impose difficulties in Romania.

Many of the respondents (46.2 percent) agree that it is difficult to identify funding sources, and 33.3 percent of women entrepreneurs fully agree with this. 38.5 percent of women entrepreneurs totally agree that it is difficult to maintain the right employees, and 33.3 percent agree.

The majority of women entrepreneurs (66.7 percent) who took part in this study believe that women have the same business opportunities as men. Thus, it is not at all surprising that 43.6 percent of the subjects consider that women should not make more effort than men when they want to develop a business, and 17.9 percent have an indifferent position about this statement.

Most of the respondents (38.5 percent) maintain an indifferent position towards the statement by which female entrepreneurship is encouraged and supported in Romania, while 28.2 percent agree with this statement.

Also, 51.3 percent of the participants in the study believe that the company offers the same trust to women entrepreneurs as it offers men to entrepreneurs.

Investors are more willing to invest in women-led start-ups, it does not seem to be a statement to convince respondents, most of them (43.6 percent) have an indifferent position, and 33.3 percent are in disagree with this.

Women entrepreneurs believe that customers have a very good (51.3 percent) and good (46.2 percent) perception of the environment of their business.

Regarding the image of the company that the study participants own, 51.5 percent consider that it is very good, and 38.5 percent of them consider that the image of the owned company is a good one.

The majority of respondents (46.2 percent) do not know whether in Romania female entrepreneurship benefits from adequate support from the authorities, while 30.8 percent consider that female entrepreneurship is supported by the authorities.

Also, the respondents (82.1percent) consider that the professional training is an important factor of the success of a business in female entrepreneurship.

The legislative environment in the European Union (EU) is considered neutral by the vast majority (61.5 percent) of the subjects, and 28.2 percent consider it favorable.

Next, we aim to see if there are differences in perception regarding the effort that a woman must make compared to a man when she wants to develop a business, and in achieving this goal we will use statistical analysis χ^2 .

H_0 = The effort that a woman has to make is equal to the effort that a man has to make when he wants to develop a business.

H_1 = A woman has to put in more effort compared to a man when she wants to start a business.

A chi-square goodness of fit test was used (Figure 1) to test whether the pattern of the effort made between men and women when they want to develop a business differed from randomness. Expected frequencies in all cells were greater than five. Total agreement regarding a greater effort on the part of women (6), agree on a greater effort on the part of women (9), indifference in terms of greater effort on the part of women (7), disagreement regarding a greater effort on the part of women (11), total disagreement regarding a greater effort on the part of women (6), are not statistically significantly different, $\chi^2(4, n39)=2.41$, $p= 0,66$, indicating that there is no difference between the effort that a woman has to make and the effort that a man has to make when he wants to develop a business.

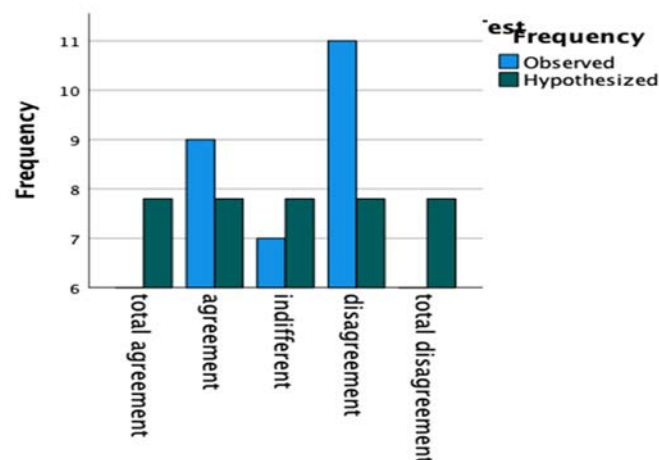


Figure 1. Perception regarding the effort that a woman has to make compared to a man.

At the same time, we are interested to see to what extent there is an association relationship between the business opportunities that men and women have, respectively the trust that society gives to women and men entrepreneurs. In this direction we made a Pearson correlation between these two variables (Figure 2).

Figure 2 shows that there is a moderately positive correlation ($r = 0.54$), statistically significant ($p = 1.0$), between offering the same business opportunities to both women and men (independent variable) and offering confidence to women entrepreneurs and men entrepreneurs (dependent variable).

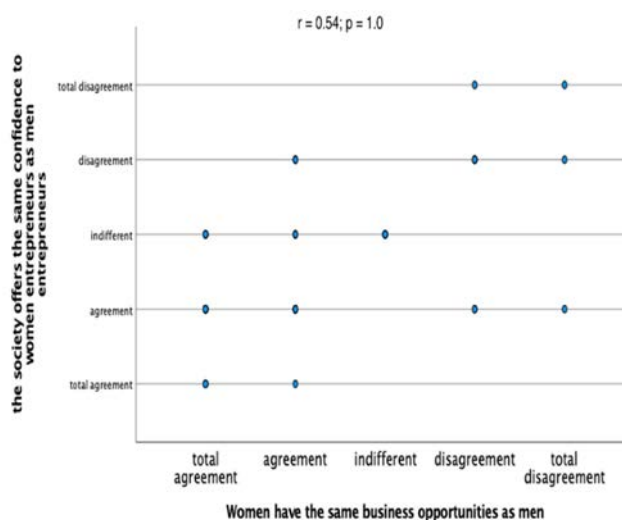


Figure 2. Scatter Plot of “The society offers the same confidence to women entrepreneurs as men entrepreneurs” by “Women have the same business opportunities as men”.

We are also interested in seeing the respondents' perception depending on their age, on the difficulty of the process of starting a business. To achieve this we resorted to analysis by groups.

After analyzing the data, we can see (Table 2) that 81.3 percent of respondents aged 18-35, agree that starting a business is a difficult process.

Table 2. The difficulty of starting a business by age categories

Age	Frequency	Percent
18-35 Valid	total agreement	5 31.3
	agreement	8 50.0
	indifferent	2 12.5
	total disagreement	1 6.3
	Total	16 100.0
35-45 Valid	total agreement	2 14.3
	agreement	6 42.9
	indifferent	2 14.3
	disagreement	3 21.4
	total disagreement	1 7.1
Total	14 100.0	
45-65 Valid	total agreement	2 25.0
	agreement	3 37.5
	disagreement	2 25.0
	total disagreement	1 12.5
	Total	8 100.0
>65 Valid	indifferent	1 100.0

The agreement regarding the difficulty of starting a business, is in a percentage of 42.9 percent in the age category 35-45 years, and in the same age category 21.4 percent show their disagreement with this statement.

Subjects belonging to the age category 45-65 years in proportion of 37.5 percent agree with the fact that starting a business is a difficult process, and in an equal percentage of 25 percent they totally agree.

Discussion and conclusions

As it results from the study, most respondents have less than 9 employees from which we can deduce a smaller size of the entrepreneurial project. Therefore, an aspect of theoretical interest with practical results could be to identify the reasons for the smaller size of the business and to identify solutions for the development of women-led companies.

For female entrepreneurship to contribute to the economic development of a state, it is not enough to have a large number of women entrepreneurs, but it is necessary to create conditions for building an environment conducive to the development of female entrepreneurship. Based on this idea, we noticed that a favorable environment for women entrepreneurs involves identifying barriers and providing appropriate solutions, providing adequate support from both government and society.

The research carried out confirms Romania's favorable position regarding ensuring equal rights between women and men, as most women entrepreneurs participating in the study consider that they have the same business opportunities as men. Also, the majority of respondents consider that the company gives them a similar trust to that of men and they enjoy a very good perception of the company's image. With this favorable basis, it is important to build appropriate solutions to overcome other obstacles, such as access to finance, attracting investors, given that in terms of support from the authorities, only about a third of women entrepreneurs believe that there is adequate support from the authorities.

Understanding the barriers specific to women entrepreneurs will be a central point for supporting and recovering the post-pandemic economy.

Notes

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THE CHALLENGES OF THE PANDEMIC IN THE PARTNERSHIP BETWEEN BANKS AND ENTREPRENEURS

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Abstract

Purpose – The present paper proposes to analyze the impact that the Covid-19 pandemic had in particular on the banking system and on the relationship between companies and banks.

Methodology / approach – The research methodology assumed, the bibliographic study of national and international specialized literature, the collection of statistical data from national and international data bases, It can be formulated relevant conclusions regarding the functioning the banking system and how it responded to entrepreneurial needs.

Findings – The own contribution followed both the analysis of the existing links between the performance indicators recorded by the economic environment during the Covid-19 period, and the static and dynamic analysis of these indicators.

Research limitations / implications – The objective of the work was to present the quantitative correlations between the measures taken by financial-banking institutions and the activity of economic agents. The research sought to determine the degree of adaptability of the Romanian entrepreneurial environment, to identify the difficulties faced by managers at the sectoral level.

Practical implications – The study carried out allowed us to formulate some conclusions regarding the current economic reality,

Originality / value – The quantitative and qualitative indicators gave us an overview of the analyzed aspects.

Key words: Covid-19, banking system, entrepreneurship

Introduction

In the framework of this research, we wanted to present the effects that the COVID-19 pandemic had on the economic-financial UI environment in Romania. Although there were similar events at the beginning of this century, SARS (2003), bird flu (2003-2015), swine flu (2009-2010, declared pandemic), MERS (2012), Ebola (2014) and Zika (2016), the COVID-19 pandemic had effects at a global level [Dorobantu D. et. al, 2019], [Marcuta et. al, 2020]. In the period 2020-2022, society adapted to a crisis that was not generated by economic or financial factors. How did Romania manage this medical crisis in the European context? What influence did the European institutions have on the measures taken at the national level? What was the impact of the crisis at the microeconomic level? These questions generate answers in several areas.

The uncertainty associated with the evolution of the pandemic and the restrictions implemented by the authorities to limit the spread of the virus have substantially affected both demand and supply, the world economy contracted by 3.3 percent in 2020 (NRB Final Report 2020), a more pronounced decline being avoided as a result of the extremely broad fiscal and monetary stimulus measures adopted in many countries. After significant decreases in economic activity in the first half of 2020, when international trade and investments decreased considerably, a return was recorded in the second semester. This happened against the background of the removal of an important part of the restrictions, of the

adaptation of economic activity to the new norms of the pandemic and the prospect of implementing viable collective immunization solutions through vaccination. The year 2021 ends with an improvement in macroeconomic conditions, according to the data published by the NRB in the Financial Stability Report of December 2021. The increase of the prices in the energy field and the disruptions in the supply chain generate a severe systemic risk. The delay in reforms and the absorption of European funds are two other aspects that generate high systemic risks. After the financial crises of 2008 which had effects on the whole economy and which led to a fragility of the functioning system of the whole society [Marcuta A et al., 2014], after analyzing the banking financial system at the European level, we found out that existence of some weak points regarding the applied procedures. Prudential measures were strengthened, new risk analysis methods were created. According to the Basel Banking Supervision Committee (2012), banking supervision methods and instruments are not static, but constantly evolve with the improvements made to the international supervision framework and with the development of banking activity. [Grigore Lupulescu, 2011]. Banks must quickly gain financial risk management capabilities to survive in a market-oriented environment, withstand competition by foreign banks, and support private sector-led economic growth. [Hennie van Greuning, Sonja Brajovic Bratanovic, 2009].

Discussion and conclusions

The effects of the health crisis starting in 2020, which were reflected in all areas of life, could be lessened by applying fiscal policies complemented by monetary policies.

In the Economic Bulletin of the European Central Bank from August 2020, such congruent measures are mentioned. Fiscal policy supports the population and companies, but consumers remain cautious considering the pandemic and its ramifications on employment and earnings.

At the European level, a series of measures included in new, historic programs were adopted in response to the crisis caused by the coronavirus:

- The NextGenerationEU fund for the period 2020-2027 The role of this program is described on the official website of the European Commission "In this way, the EU secures the resources for its political priorities, like digitalisation and green deal. The budget also ensures room for flexibility, thus enabling the EU to respond to unforeseen circumstances. The 2021–2027 long-term budget, or the multiannual financial framework (MFF) of EUR 1.211 trillion, will seek to support the recovery while investing in the EU's regions, farmers, companies, researchers, students, citizens in general as well as our neighbors
- Pandemic emergency purchase program PEPP in the initial amount of 750 million euros with an envelope of €750 billion carried out by the European Central Bank, as mentioned in the Economic Bulletin of the European Central Bank from 2020.
- OTRTL III includes means by which the European Central Bank grants financing to commercial banks under favorable conditions to the extent that the latter support lending to companies and the population.
- Set of relaxation measures regarding the guarantees granted by the European Central Bank between April 2020 and June 2022.
- The "Fit for 55" program, which aims to reduce gas emissions by at least 55% until 2030 at the European level. according to the data mentioned by the Council of European Union General Secretariat
- EU recovery and resilience measures to boost its economy and remedy the negative consequences of the COVID-19 pandemic in the form of grants and loans amounting to €672.5 billion. Source: Council of European Union General Secretariat, 2020. In 2021, Romania receives approval for the application of EU recovery and resilience measures to stimulate its economy and remedy the negative consequences of the COVID-19 pandemic: Gradual elimination of coal and lignite electricity based production and the use of renewable energy sources, as well as making investments and reforms in the field of building renovation, railway modernization, water and waste management, but also afforestation and reforestation are measures that Romania intends to implement them to achieve their climate goals. The amounts awarded to it, namely EUR 14.2 billion in grants and EUR 14.9 billion in loans, will also be used, among other things, to digitize the country's public services and strengthen the resilience of the health system , according to the data mentioned by the Council of European Union General Secretariat.

- SURE temporary support tool for mitigating the risks of unemployment in an emergency situation embodied in loans of up to 100 billion EURO, according to the data mentioned by the Council of the European Union General Secretariat
- EGF the pan-European guarantee fund of the European Investment Bank to unlock funds of up to EUR 200 billion, according to the data mentioned by the Council of the European Union General Secretariat
- MES the European stability mechanism support measure in the context of the crisis caused by the pandemic in the form of loans of up to 240 billion EURO for the countries of the euro area to support financing related to health, according to the data mentioned by the Council of the European Union General Secretariat

At the national level, the programs and measures could be applicable taking into account the economic, cultural and social characteristics. An important indicator in the analysis of the economic environment and the economy of a country is the gross domestic product.

The projections of Eurosystem experts regarding real GDP growth have changed in the short term, influenced by the evolution of the pandemic [European Central Bank, 2020].

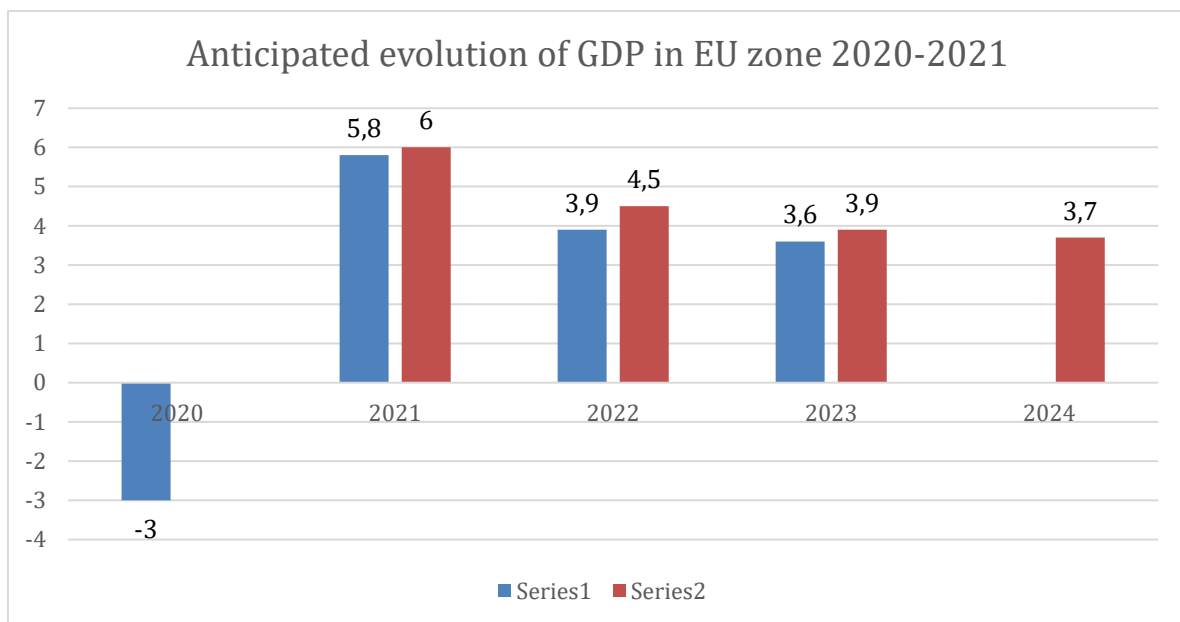


Fig.1. Anticipated evolution of GDP in the EU.
Source: own processing according to the data www.ecb.europa.eu

The data published by Eurostat highlight fluctuations in its value. There are countries such as Ireland and Turkey where GDP increased during 2019-2021. For most countries, however, the year 2020 meant a reduction in GDP. Thus, at the EU level, GDP decreased by 5.9 percent compared to 2019. Romania is also among these countries. If in 2019 it was 249.7 billion USD, in 2020 it decreased by 0.5 percent, being 248.7 billion USD (Figure 2).

GDP per capita increased during the analyzed period in Ireland, Lithuania or Serbia, but in most countries it decreased in 2020. In 2021 GDP/capita in Romania was higher than in other EU states. such as Lithuania, Croatia, Slovakia, Greece or Bulgaria. However, it remains at much lower values compared to other EU countries. (for example, it is half the GDP of Luxembourg).

The effects of the pandemic can be measured through various economic, financial and social indicators, because it affected both the population and companies and was not limited to a health crisis. By following the way companies reacted to this crisis, we can estimate the effect on the economy, and in the long term we can anticipate the market's reaction to this kind of changes.

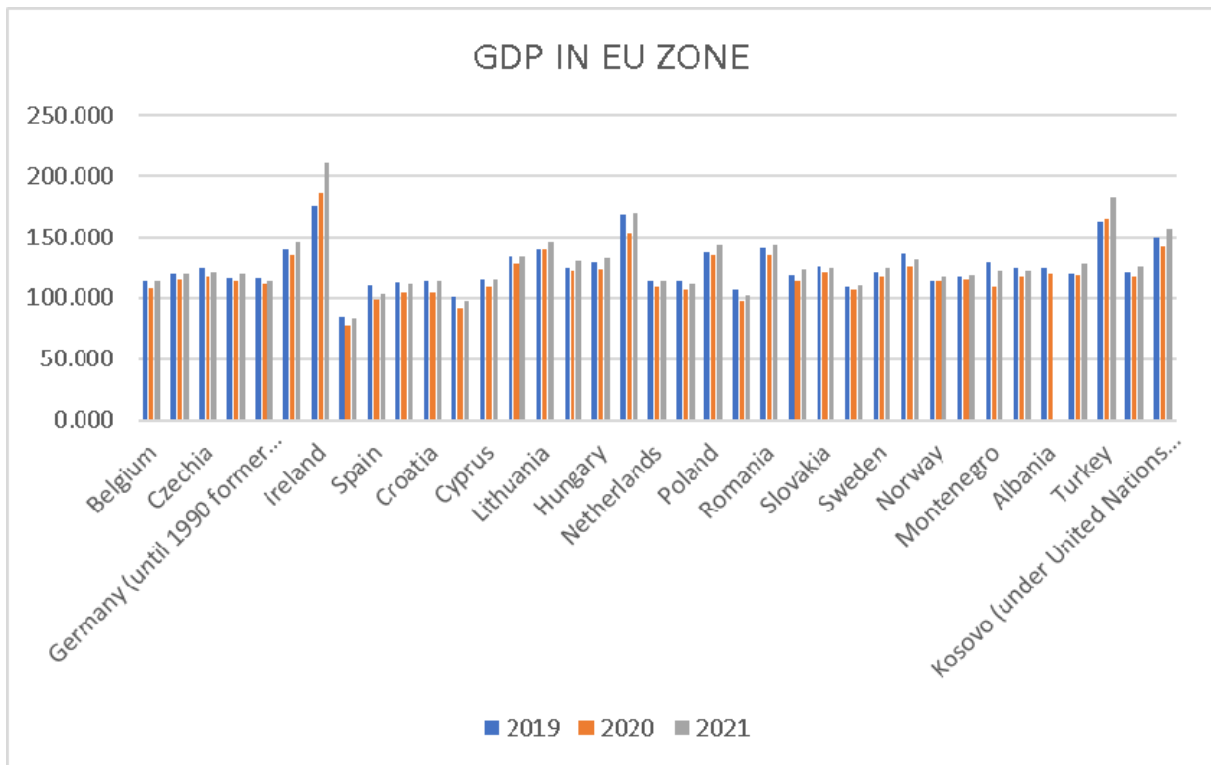


Fig. 2. GDP/capita situation in EU
Source: own processing according to EUROSTAT data

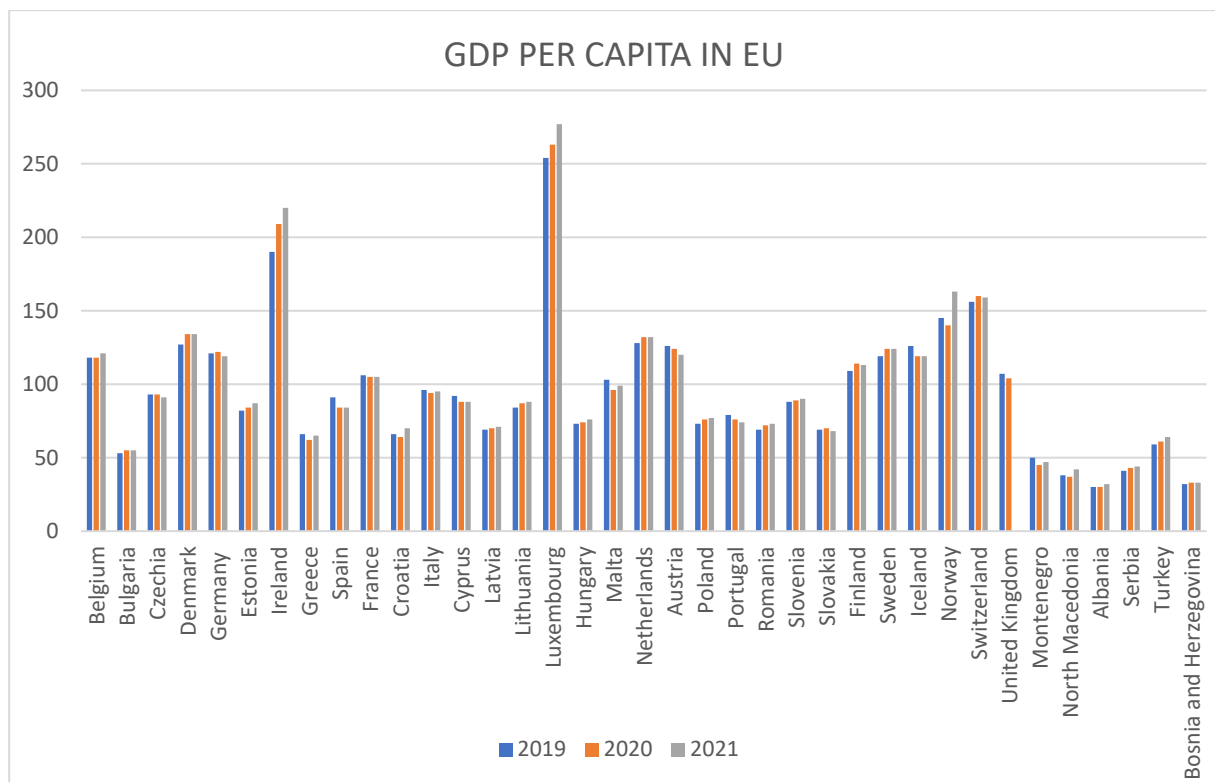


Fig. 3. GDP/capita situation in the E.U.
Source: own processing according to EUROSTAT data

At the same time, predictions can be made, measures can be taken, strategies can be developed to reduce the negative effects on the whole society, but also on an individual level.

At the level of the EU countries the number of insolvents was lower than the one estimated at the end of 2019. The data of the National Institute of Statistics indicate that the number of companies entering insolvency as a result of the fact that they faced financial difficulties during the Covid-19 pandemic was decreasing, being even the lowest of the last ten years (Figure 3), and this was due to the financial support measures that were taken at the national and international level. The stabilization of the functioning of Romanian companies began in 2015, when after a period in which the increase in insolvencies was high, the number of bankrupt companies reached less than 10,000. In 2021, the number of companies entering insolvency increased by 8 percent compared to the previous year, this is due to the restriction of the financial support granted to the business environment. However, it is expected that in the next period the economy will face an increase in these insolvencies as a residual result of the Covid-19 pandemic.

During the pandemic, many companies reduced their activity. Statistical data show that for the first quarter of 2021, they represented 25 percent of all economic entities, while entities with temporarily suspended activity represented 21 percent (NRB report). What stood out in this period was the diversification of the activity or the transition of businesses that were carried out only in the physical system to the online environment.

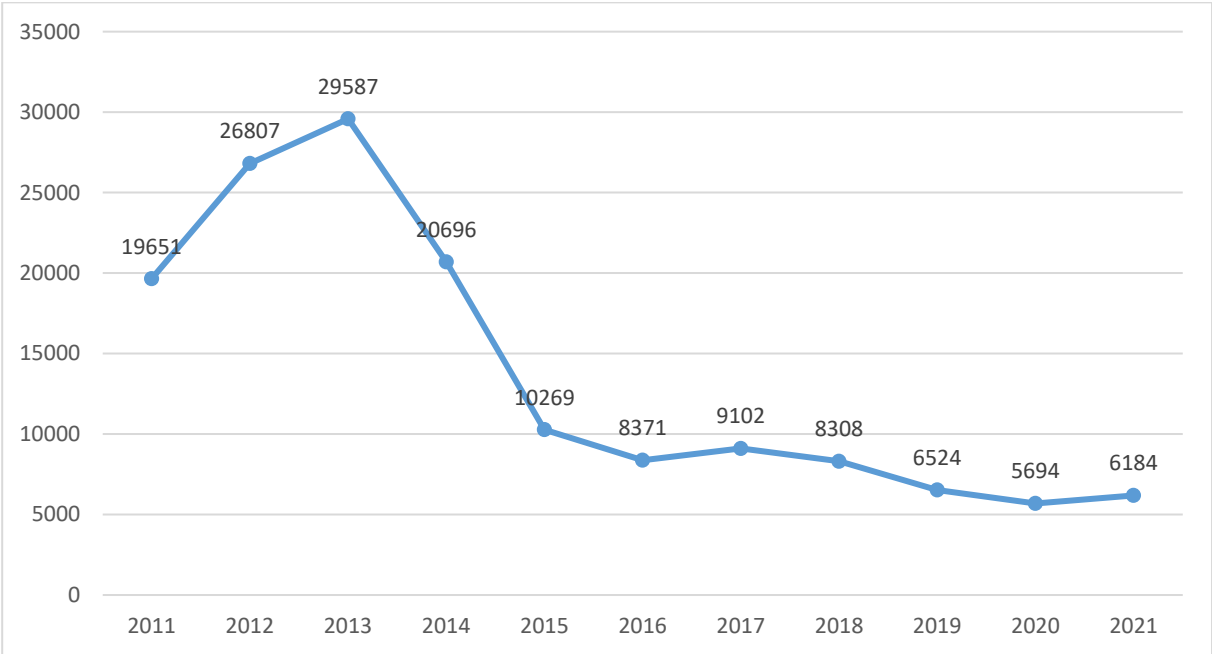


Fig.3. The evolution of insolvencies in the period 2011-2021
 Source: own processing based on INSSE data

The pandemic brought with it an increase in responsibility regarding investments and an increase in financial discipline. However, the payment arrears existing among companies at the end of 2020 have increased compared to the previous year, being almost 83 billion lei. However, the companies' attention was directed towards the payment of debts to suppliers, which made payment delays to be reduced by more than 4 billion lei. On the other hand, payment delays to the state budget increased (by approximately 3 billion lei) and to other categories of creditors (approximately 4 billion lei).

Another aspect that must be mentioned is related to the important share of companies that register equity values below the regulated value. At the level of 2020, they represented 34 percent of all companies, they have approximately 2 percent more than in 2019.

Inflation remained high. The intensification of inflation mainly reflects the sharp increase in fuel, natural gas and electricity prices, (European Central Bank 2021).

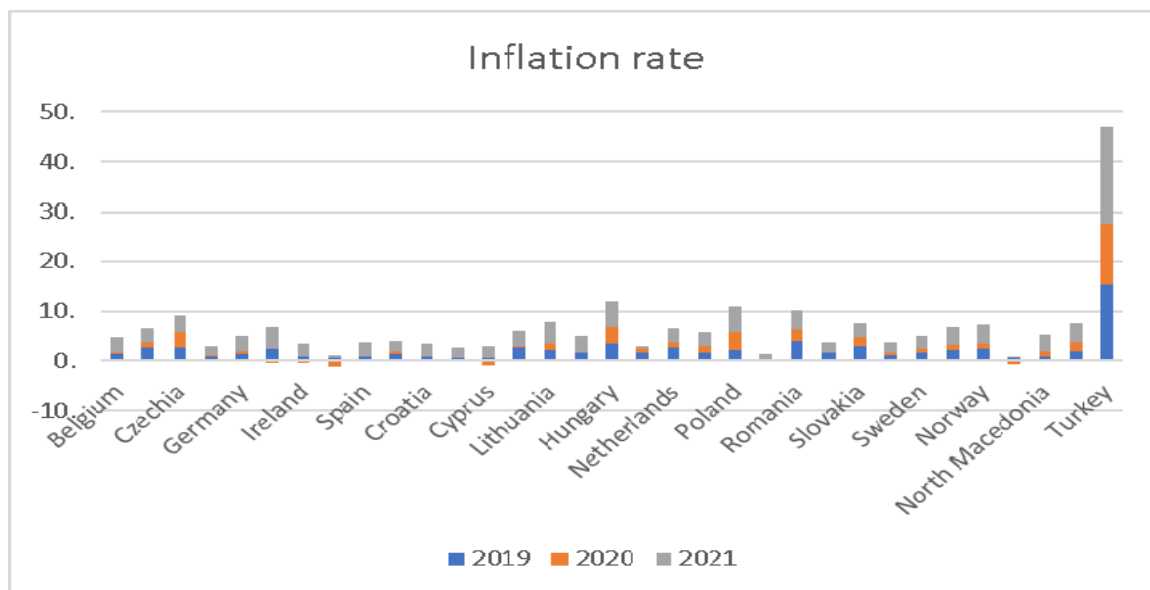


Fig. 4. Inflation rate in EU countries
Source: own processing according to EUROSTAT data

The consequences of these increases can also be seen at the level of the economic activities of the corporations, which generate blockages at the supply level, and which in turn led to the increase in prices due to the increase in expenses with stocks and working capital.

What made this crisis different from previous crises and contributed to an earthquake of the entire economy was, on the one hand, the cessation or reduction of activity for many of the fields of activity, and on the other hand, the increase in health expenses.

The isolation, the suspension of the activity had a direct effect on the demand and supply, which were significantly reduced. Therefore, the pandemic crisis itself did not have a direct effect on the economy, but the measures that were taken with the aim of reducing the effects of the health crisis, which at the same time meant a reduction in income, an increase in unemployment, a contraction of GDP and a decrease in global production.

All of these in turn determined negative effects on global financing, leading to the increase of global inequality as a result of the fact that different economic and social protection measures were adopted at the national level.

In addition to the quantifiable economic and financial aspects, public health also contributes and is an important factor of economic growth and rural development [Marcuta A et. al, 2018] that must be analyzed and included in economic policies.

The Covid-19 pandemic represented a turning point that involved overcoming some challenges to which all the countries of the world and the global economy were subjected [Marcuta L et. al, 2020]. Solutions were sought, strategies were developed and losses were limited at the individual and global level. Some specialists considered that this was the reminder of a reset that made people act much more responsibly both at the individual level and at the economic, political or social level.

The study led to the following conclusions:

- financial institutions through prudential and lending measures were able to face the unfavorable economic shock generated by the pandemic. The banks offered the companies facilities to postpone the payment of loans.
- the demand for loans was moderate, large companies accessed medium and long-term loans. 60% of the value of loans granted to non-financial institutions in the period 2020-2022 were granted in lei. Medium-term loans (between 1 and 5 years) occupy 40% of the total loans in lei granted by financial institutions.

- entrepreneurs have reinvented their relationship strategy with business partners, clients or final consumers.
- there are certain vulnerabilities in the functioning of companies and the Romanian economy that are primarily related to payment delays resulting both from the functioning of the economic environment, but also from cash-flow problems and the management of receivables and payment periods of debts
- another vulnerability is determined by the level of undercapitalization of Romanian companies as a result of recording some negative results; although the number of these companies is decreasing, there is still an important share of them, which, if fixed, could contribute to recording an economic growth of several percent

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CHALLENGES IN DECISION-MAKING AUTONOMY IN ROMANIAN PRESCHOOLS DURING THE COVID-19 PANDEMIC: AN EXPLORATORY SYSTEMATIC REVIEW

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Abstract

Purpose – *The present study aimed to review the published findings related to the challenges in decision-making autonomy in Romanian preschool settings during the Covid-19 pandemic. Our question was the following: „What do we know about the challenges in decision-making autonomy in Romanian preschools during the Covid-19 pandemic?”*

Methodology/approach - *We followed the guidelines for a systematic review (though we proposed an exploratory, narrative view). We consulted four databases, i.e., Google Scholar, Eric, DOAJ, and Science Direct. The Key-terms that we used were the following: Covid-19 + management + decision + preschool + Romania.*

Findings – *Our research findings proposed 109 research articles that aligned with the proposed criteria. Out of these studies, none of them addressed our research question.*

Research limitations/implications *Our research highlights the scarce evidence concerning the challenges in decision-making autonomy in Romanian preschools during the Covid-19 pandemic.*

Practical implications – *our results call for further research on this matter, especially considering the challenges and effects of the Covid-19 pandemic on other different management fields, such as the medical domain, environmental nanotechnology, ergonomics, and health.*

Originality/value – *Our research explores the management -related challenges and opportunities in a post-pandemic reality, highlighting that extensive research is needed to better understand and manage the various and complex challenges managers of preschool education settings face in the context of covid-19 pandemic*

Key words: *decision; COVID-19; autonomy.*

Introduction

Decision-making is a manager's main activity, and all the other activities are carried out to ensure that the decision has already been taken to implement and monitor its effectiveness. Furthermore, managers must decide when and to what extent they will involve their subordinates in decision-making, as employee involvement determines the quality of the decision-making act and the degree of participation in the application of decisions (Lunenburg, 2010). In an educational setting (specifically, in the Romanian education system), the management is manifested at the following levels: top management (i.e., leadership level); middle management (i.e., level of commissions/departments/compartments), and operational management (i.e., level of preschool/parent groups) (Håkansson, 2016).

Top managers, i.e., kindergarten principals, establish objectives, strategies, and policies, represent the organization concerning the central and local administration, being responsible for the overall process processes of the organization. In addition, they engage in developing long-term plans, guiding their kindergarten's future activities. Also, they establish the objectives and strategy at the global level of the organization to facilitate and stimulate the kindergarten's adaptation to change. To ensure quality strategic management, the director must exceed the status of the manager and fulfill the leading role.

However, the Covid-19 pandemic brought major changes to the educational systems and, implicitly, to the management processes and decision-making autonomy in all educational institutions, including preschool units. In addition to adapting to online teaching during COVID-19 schools and kindergartens closure (König et al., 2020), managers from the education sector had to rethink the communication and decision-making processes, facing various challenges in this regard (Msila, 2021).

The present study

The present study aimed to investigate the findings related to Challenges in decision-making autonomy in Romanian preschool settings during the Covid-19 pandemic. Furthermore, we aimed to perform a narrative review on the results published in this area from March 2020 until May 2022. Therefore, our question was the following: *What do we know about the challenges in decision-making autonomy in Romanian preschools during the Covid-19 pandemic?*

To answer this question, we explored the published research in this area, using the PRISMA (2020) guidelines for a systematic review. The review or systematic review is a critical evaluation that is carried out using systematic methods proposed/developed to minimize errors and to combine the existing evidence on a specific topic (in the present case – PRISMA). However, this was an exploratory approach, aiming to serve as a future starting point for future, extended investigations.

Research procedure

We followed the guidelines (PRISMA, 2020) for a systematic review (though we proposed an exploratory, narrative view). We consulted four databases, i.e., Google Scholar, Eric, DOAJ, and Science Direct. The Key-terms that we used were the following: Covid-19 + management + decision + preschool + Romania. We also used these *additional inclusion criteria*: (1) Language: English; Type: Research Articles; Publishing timeline: 2020-2022.

Results

Following the consultation of the proposed databases, the results revealed a total of 109 research articles. Out of these articles, 102 results were revealed from the Google Scholar Database, 7 results were revealed following the consultation of the Science Direct Database, while the two other databases revealed no further results (i.e., DOAJ and ERIC). Thus, our research findings proposed 109 research articles that aligned with the proposed criteria. Out of these studies, none of them addressed our research question. Despite the initial number of records found (n=109), most studies focused on the mental health of children during the pandemic, coping and stress, associated diseases (e.g., Gao et al., 2022), vaccine acceptance/hesitancy (e.g., Torracinta et al., 2021), resilience (e.g., Manchia et al., 2022).

Discussion

The present findings related to education mainly were associated with teachers' satisfaction, digital literacy (e.g., Li et al., 2022), socio-emotional competence (e.g., Lozano-Peña et al., 2021), or digital technology (e.g., Haleem et al., 2022). However, some studies referred to decision processes when discussing preschool settings by referring to the experiences and challenges of distance learning during the COVID-19 pandemic from educators' point of view (Faridah et al., 2021), coping within classroom management challenges (e.g., Chaw et al., 2021). Other studies referred to the decision-making processes in education, i.e., Skubiak (2021).

In the end, none of the studies were included in the review since none referred explicitly to our research question and study theme, i.e., Romanian preschool management's challenges during the Covid-19 pandemic (see Fig.1.).

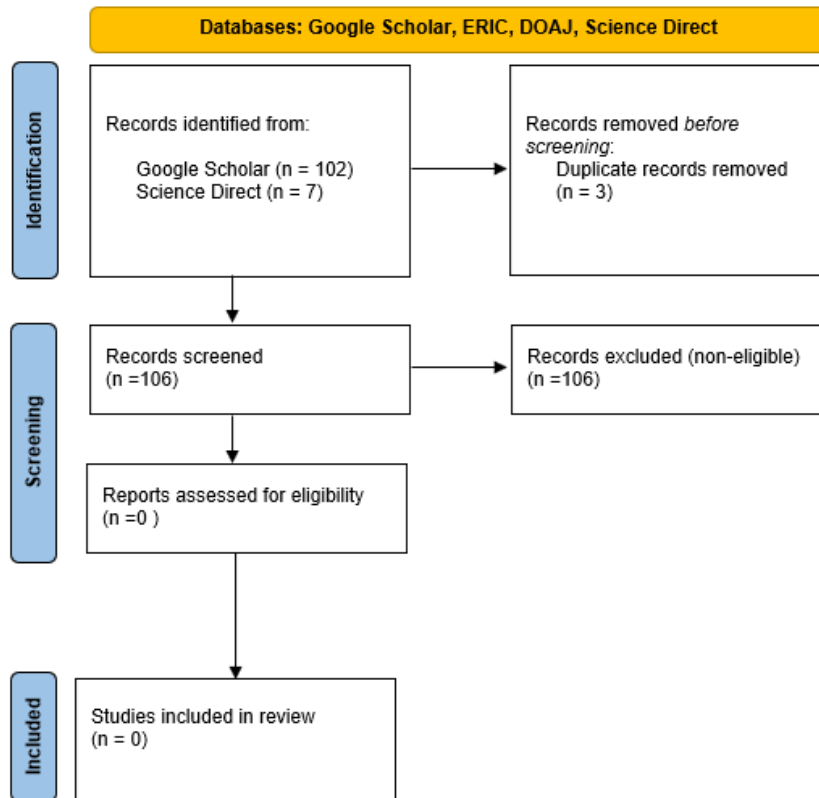


Fig.1. Findings related to the inclusion criteria (Prisma chart)

Conclusion

Our research addresses the management challenges and opportunities in a COVID-19 post-pandemic reality, highlighting that extensive research is needed to understand better and manage the various and complex challenges managers of preschool education settings face in the context of the COVID-19 pandemic. However, the exploratory nature of the present paper raises several limitations, such as the number of databases consulted, and the fact that we did not account for the unpublished research. Given the recent events related to the pandemic, and the fact that this crisis health is far from being over, there are probably many studies undergoing a review process, that might be included in subsequent reviews, such as the present one. Nevertheless, this study is important as it raises awareness related to the scarce evidence concerning the management changes and challenges (and, maybe, opportunities as well), due to the COVID-19 pandemic.

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MANAGEMENT TRAINING AND INCREASE IN THE QUALITY OF TEACHING STAFF IN PRESCHOOL EDUCATION IN THE CONTEXT OF CHANGES OCCURRING AFTER COVID 19

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Abstract

Purpose - Identifying the factors that influence the increase in the quality of the entire educational process and the adaptation of a set of measures to modernize the teaching-learning-evaluation system and increase the professional (didactic) competence.

Methodology/approach – Application of a questionnaire to identify the digital skills of teaching staff and directions for the need for improvement

Findings – The hypothesis closest to the empirical findings is that the results of the use of digital technology in education depend on a variety of conditions, among which the competence of the teaching staff is the most important

Limitations/implications of the research – subjectivity of teaching staff, lack of interest, lack of time needed for improvement

Practical implications – Proposals for effective educational practices, innovative courses for the effective integration of digital technologies in education

Originality/value – This paper provides an overview of how early childhood education teachers deal with HR quality and motivation for improvement

Key words: reform, pandemic, efficiency, performance

Introduction

The managerial process in preschool educational institutions should be well organized, carried out systematically. Every educator, teacher and professor in the entire education system must be both a good specialist in the field and a good pedagogue. Only by combining these two qualities, the teaching staff will fulfill their task of high responsibility and honor in the training of the young generation in good conditions. The multidisciplinary training and specialization of the teacher in didactic and managerial activity entitles him to become the designer, organizer and manager in perfect control of all the determining factors that lead to the educational modeling of the child from the earliest age. In Romania, education has known several experiments under the umbrella of the reform, which in the vast majority have only aimed at beautifying the system and not a substantive structural reform, in which both the current situation of the educational system and the positive element of the old educational system, the Romanian educational tradition, the economic perspective of the country in the context of the market economy and globalization, as well as the educational ideal desired by the whole society. Pursuing the achievement of performance criteria, the quality improvement policy must stimulate not only the fulfillment of individual specifications, but must focus on creative, innovative, individual and collective effort. Along with the pandemic and the obligation to use educational platforms in teaching, many deficiencies were discovered in terms of the skills of teachers and managers in using new technologies. The pandemic has opened a new vision for change and an opportunity to modernize the entire education system.

The current study

The present study aimed to investigate the findings related to the identification of the factors that influence the increase in the quality of the entire educational process and the adaptation of a set of

measures for the modernization of the teaching-learning-evaluation system and the increase of professional (didactic) competence. Therefore, our question of was the following: Are preschool teachers prepared to apply new technologies in the teaching process? Are we ready for the digitization of education? Do the training courses currently on the market meet the needs?

In order to answer these questions, I proposed to carry out an investigative study on a representative sample of 40 teachers, both from rural and urban, state and private, with different levels of professional training. The questionnaire called C.R.U. was applied. (Human Resource Quality) in order not to influence some answers, in two initial and final phases (beginning of the semester and end of the year/semester) to be able to observe as objectively as possible the possible changes and to which factors they are due. All questionnaires were completed anonymously, in electronic format on the GoogleDocs platform. The applied questionnaire is a linear one, each person must answer all the questions, in the order in which they appear in the questionnaire, and it contains 22 items to identify the perceptions of pre-school teachers regarding professional training. The questionnaire includes both closed questions and semi-open and open questions, in order to capitalize on all types of questions and obtain as much information as possible from the subject (Source: https://www.academia.edu/33044053/Seminarul_5_chestionarul Accessed on 20.07.2022 at 17.30). The main objective was to identify the perception of the professional quality of teaching staff and the need for improvement. The questionnaire includes two sets of variables: general variables in which are captured - general characteristics of the interviewee, of the organization (items 1-6) and variables specific to the research that capture the identification of the need for continuous training and improvement by preschool teachers (items 7 -22).

Result

Following the analysis of the answers received, the results revealed that participation in continuing education courses is considered useful and very useful by 84% of the teachers. 96% of the respondents stated that they participated in continuous training courses. The majority of teachers who participated in continuous training courses believe that the concepts learned are useful and can be applied in everyday practical work. Also, 75% of the participants in continuing education courses believed that they helped them adapt to the new generation of students, 75% noticed an improvement in the instructional-educational activity and student results, and for 79% of the teachers the courses they were useful to familiarize themselves with the new teaching and learning technologies. The results of the study indicate a generally favorable attitude towards the concept of continuous training as well as the need for a more varied offer for such courses made available by the educational unit free of charge.

Discussions

In the midst of the changes brought about by the pandemic, the key elements of the reform must take into account, first of all, the development of schools as learning communities, in which the joy of learning and the atmosphere of collaboration between students, but also between students and teaching staff. Thus, didactic methods must also be diversified, translated from individual learning to collaborative learning. The paradigm of the 4 Cs – communication, collaboration, creativity, critical thinking – can be a pedagogical framework for choosing the most inspired didactic and educational interaction strategies from this point of view. As digital technology has advanced, the possibilities for its use in the educational environment have grown exponentially. The effect of digital technology on students largely depends on how these technologies are integrated into the classroom to facilitate the teaching-learning process. The literacy level of teaching staff is, from this point of view, essential in facilitating learning through the means of digital technology"(Ceobanu, C., Cucuș, C., et.all, 2020, p.47).

In 2020, the Ministry of Education and Research launched the SMART.Edu campaign, which aims to transform education for the digital age. In the presentation document of this campaign, a series of measures that should be followed in order to align with the digital norms of European education are detailed. "Digital education throughout life is more than a goal and a finality of education, but becomes an essential premise and a means for accessing and acquiring skills in all other educational fields"(<https://www.edu.ro/sites/default/files/SMART.Edu%20-%20document%20consultare.pdf>). Digital education (Ceobanu, C., Cucuș, C., et.all, 2020), represents a paradigm that follows various innovative application courses of neurocognitive sciences, with strong transformative effects at the level of the personality of education actors (teachers and students). Digital education contributes through new methods, through access to information, through the quality of information to the better development of education at any level. Regardless of the number of advantages, the development of connectivity and

other positive elements that digital education brings to the lives of children (European citizens), there are also different types of risks and disadvantages, related to data protection and security (Ceobanu, C., Cucos, C., et.all, 2020, p.83). In order to understand the concept of digital education, it is necessary to know some specialized concepts, such as the concept of digital learning, educational software, digital literacy, digital cooperation, cyberbullying, digital participation and digital teaching. The importance of continuous training of teaching staff is given by the need to update knowledge and professional skills, increase the quality of the educational act by adapting to new technologies. However, there is a large discrepancy between the training courses that teachers often follow and the skills they need: ICT skills for teaching, new technologies in the workplace, individualized learning strategies and the formation of interdisciplinary skills in students, and so on. In order to be able to react to the changing pace and demands, teachers need adequate support and the opportunity to follow continuous training activities, in which they develop lifelong learning skills and collaborate with colleagues. The modernization and improvement of education and didactic technology is an objective necessity of all teachers in order to be able to keep up with the current generation. It is a priority to identify the deficiencies in the professional training of teachers by means of a SWOT analysis, a questionnaire or a focus group in each school unit in order to identify the most suitable improvement programs. Teacher training activities aim at objectives and contents that have a direct impact on the educational process carried out in the school and are centered on the main pedagogical approaches, respectively: analysis, design, implementation, evaluation and improvement/development of the process.

Conclusions

Preschool teachers are concerned with training, but a practical approach to content is needed with an emphasis on the integration of new technologies and the application of educational software, virtual games, ppt presentations.

We can say that the changes produced in society and the forecast of the acceleration of changes lead not only to the continuous adaptation of educational systems to the new economic, social and cultural realities, but also to the formation within these systems of the capacity for continuous regulation and self-perpetuation of adaptability. In order to face the challenges of the contemporary world, teachers must learn continuously, adequately, quickly and efficiently, innovatively, making the most of their potential. Continuous training becomes a permanent necessity regardless of the professional field and the level of training.

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CASE STUDY ON THE INFLUENCE OF COVID 19 ON MANAGERIAL COMMUNICATION IN ROMANIAN SMEs

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Abstract

Purpose - To analyse the communication strategy in terms of effectiveness and efficiency, for the company and for the health and safety of employees, and the reintegration into the workplace of people who worked during the pandemic in a telework or hybrid system in an SME in Romania, which had NON-EU employees.

Methodology/approach - Bibliographic study method - due to the multitude of information that is constantly exploding, this method is vital to any research study. The case study method - is a suitable method if a full and in-depth investigation of a topic is desired.

Findings - Remote and work from home have become the new normal, post-pandemic. Communicating with employees has become a top priority for businesses.

Research limitations/implications - The limitations of the research are due to the fact that this research was conducted on a single SME.

Practical implications - It consisted of a case study carried out on a communication plan at an SME in Romania.

Originality/value - It is valued by the case study analysis and conclusions.

Key words: Influencing managerial communication in pandemic and post pandemic period, Managerial communication during pandemic, Managerial communication strategy in post pandemic period.

Specific aspects of communication during the COVID 19 pandemic reflected in specialized literature

Communication is an art that extends beyond words. Even if there is no unanimously accepted definition among communication experts, it essentially offers the establishment of relationships between people, no matter in what form it is used. Managerial communication is a key factor in any business and is needed both internally and externally. The realities of the pandemic, and later the post-pandemic period, have brought to the surface major challenges for even the top managers and entrepreneurs. With the emergence of the SARS-COV2 COVID-19 virus, the world has faced situations not seen in the last century. Both the public and private systems had to reconsider their activities, especially human resource management, because of the health protection rules that emerged immediately after the virus emerged.

The communication plans had to be revised because of the recommendations given by the WHO and especially because people's health was at risk.

In 2020, Mala (2020) started to draw managers' attention to issues that will affect small and medium-sized enterprises in particular, namely: 1. Financial security and job protection, 2. Employee health, safety and well-being, 3. Transition and management of work from home, 4. Frequent and clear communication with employees to keep them up to date with changes.

Joel Carnevale (2020) pointed out that the pandemic has had a big psychological impact on employees, with uncertainty at every turn. At the same time, the author also pointed out that more attention should be paid to workplace stress and working conditions, as employees are the viable face of any business.

Lewis (2020) pointed out that during the pandemic period, both employees and especially managers wanted to rethink health policies so that employees could be given the opportunity to seek medical attention in case of symptoms or illnesses, to avoid hospitals and incur the related costs.

Marwitz (2020) offered seven best practices in managing employees during the pandemic, including 1. Continuous communication, 2. Continuous verification of legal provisions, 3. Successful planning for remote work, 4. Consider the possibility of employee illness or quarantine, 5. Consider when employees are affected by school closures.

Singh (2020) suggested a number of strategies for managers, namely: 1. Companies that had vacancies needed to consider the new rules in labour law, and also in health rules legislation, 2. Post pandemic, managers need to pay more attention to employees' health and well-being, creating employer-employee relationships is a must, 3. Employers need to pay attention to digital literacy and the possibility to quickly organise work at home in case of a new pandemic etc.

In 2021, based on an analysis, the author showed that 60% of employees believe that the company will prioritize continuity over job security (Drosky, 2021), the same analysis showed that 44% of managers had the same opinion.

Case study - Analysis of changes in communication in an SME in Romania

While carrying out the case study on the communication plan of a small enterprise, whose activity is the wholesale of ceramic, glassware and maintenance products, we found a quite significant fluctuation of employees from the beginning of the pandemic to its end.

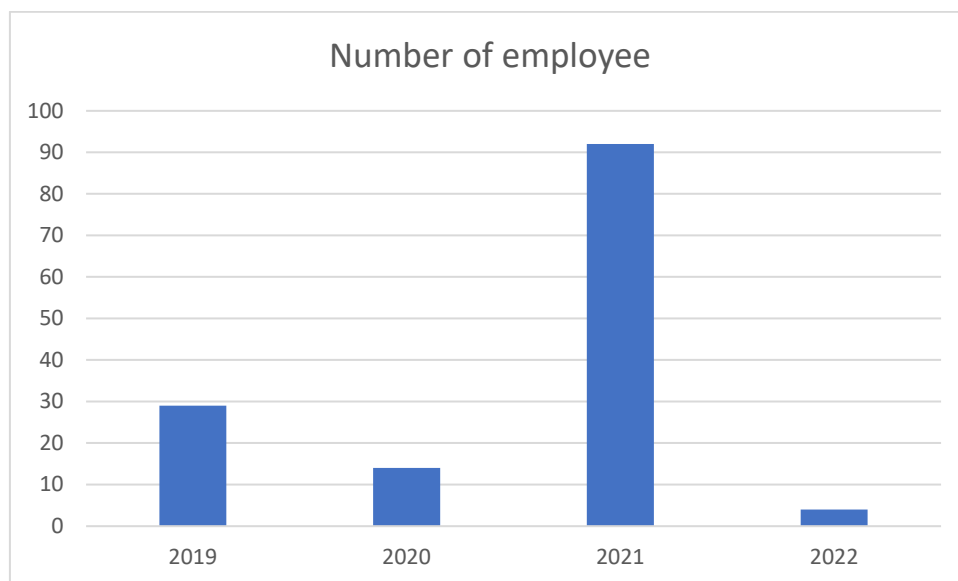


Figure 1

Before the pandemic started, the communication plan was hierarchically structured, with information/reports being passed on verbally and only those in management communicating the information in writing. The communication plan was simple, but the information was prone to being lost or misunderstood.

At the beginning of the pandemic, the case study company had 14 employees in various positions, both executive and managerial, all Romanian citizens. In 2021, the company employed 78 non-EU citizens from Nepal. At the end of the pandemic period, i.e. in March 2022, the company still had 3 employees, of which 2 were non-EU citizens.

As a company, which had to execute its part of the contracts, i.e. existing orders, it was impossible to work from home. Packaging, i.e. packing products for delivery, is a process that includes thousands of materials such as cardboard, polystyrene, thermo foil, etc., and some parts of the process include the use of certain equipment. Given the above mentioned aspects, the company adopted since the beginning of the emergency a hybrid work system, whereby employees were physically present at the workplace 2 days/week, which was decided on the basis of an assessment of risks to the health and safety of employees.

In order to streamline the work of people at home and people physically at work, a somewhat standardised communication plan was adopted, with procedures and a matrix of responsibilities. The responsibility matrices were reconsidered and adapted to work from home, excluding responsibilities for physical verification or travel. Each activity in the responsibility matrix has a standard procedure that specifically explains the activity to be performed, how much time is allocated to the activity and to whom the activity should be reported. This model involved hierarchical communication, with each employee reporting the work performed and any problems encountered to the direct supervisor.

The communication had to be in writing, so that it could be followed up by the company's management. In order to monitor the effectiveness of this communication plan, the company required an Ishikawa analysis to be carried out to analyse the problems, then a SWOT analysis was used. At the end of each month, the company's management met via an online platform to review the reports made by each line manager.

The final monthly report was finalised by the company's administrator based on the analysis and conversations with the line managers. Based on these reports the administrator proposed changes to the communication plan. Also any form of communication that included human interaction was limited, in the sense that any document requesting something from the administration or management was transferred to standardized and typed documents. These documents were made available by the company, and through which the aim was to reduce human interaction as much as possible.

In 2021 when the company received the foreign employees, the communication system was changed, because the new employees were in manual packer positions, making it impossible to work from home. Prior to the arrival of the employees, another risk assessment was carried out, suggesting normal working hours, but with more frequent hourly breaks so that the premises could be ventilated. The whole communication plan was also rethought so that new employees could understand it. All responsibility and procedure matrices have been translated into English. After their arrival, the company was faced with a problem not taken into account, namely the low level of understanding of English. The documents were re-translated into Nepalese so that the instructions could be understood much better.

Once the problem of communicating how the work would be carried out was solved, the company encountered problems with understanding the prohibitions imposed at the time by the Romanian state, and with understanding the labour legislation in terms of their rights and obligations. As the cultural differences were major, in the first months after the employment of foreign citizens, the company faced various problems such as unjustified absence from work, leaving the workplace for longer periods of time without breaks, etc.

In order to solve the problems of understanding the legislative rules, explanatory posters, both with written message and illustrations, were made to be more easily understood in both English and Nepali. Explanatory classes were also used to explain the labour legislation to non-ueue people to eliminate this problem as well.

After the end of the alert period in March, the company reconsidered the communication plan, and all the employees' work. The administrator decided that some areas of activity should remain in a hybrid system, namely accounting and people in charge of online sales platforms. From the communication plan adopted during the pandemic period, the aspects of standardised communication via matrices and procedures, written reporting via emails and weekly reviews were kept.

To reintegrate people into the workplace, especially those who worked in hybrid, a temporary communication plan was adopted, which involved the HR person spending 2 hours per week physically talking to employees to establish their needs. This temporary plan was adopted for a period of one month. All aspects of the communication plan that included the standardised process were retained by

the company and were considered by them to be the most effective aspect of the communication plan during the pandemic.

Conclusions

In our opinion, the temporary communication plan was an important factor because the standardized, though efficient, process is rigid, with human interaction taking place only via email. Interpersonal communication is the most important factor for creating relationships between people, due to the fact that it involves both verbal and nonverbal communication, which have a greater psychological impact, than communication via email.

Interpersonal relationships, especially at professional level, are based on communication. Both between colleagues and between managers and employees, relationships can be established when there is communication.

In conclusion, the company's communication plan has been drawn up responsibly, in the sense that it has been developed on the basis of recommendations, and on the basis of a risk assessment. The plan was executed by both manager and employees, which indirectly led to teamwork. The standardisation of communication during the pandemic period was effective for the whole company and subsequently one of the most appreciated aspects by employees and management. In my opinion the communication plan also had some gaps and omissions, such as not addressing the situation where employees would get sick or the situation where they would be affected by school closures. We consider it a positive aspect that standardised communication, and some aspects of the communication plan, were maintained in relation to home working. Practice has also shown that regardless of culture, people can be made more effective if there is a well-done and executed communication plan.

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THE CHALLENGES OF THE PANDEMIC ON A GLOBAL AUTOMOTIVE IMPROVEMENT PROJECT

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Abstract

Purpose – The paper has the purpose to present the biggest challenges during pandemic period for automotive industry and examples from a global automotive industry of a standardization project

Methodology/approach – The authors of this article, carried out a research study on how the Covid-19 Pandemic affected the automotive industry around the world and came with specific examples from their daily activity. We used general methods of analysis, comparison and case study.

Findings – Challenges can be great opportunities if they are viewed from the right angle. The companies, especially industrial companies must keep pace with the development of technologies and customer demand

Research limitations/implications – The paper is limited to automotive industry, larger research is necessary for a general conclusion of the researched topic.

Practical implications – As a project member in Romania - where planning and pilot-run was done for inspection improvement project, taking decisions in a critical time, as Pandemic was, is an important step to personal and company development.

Originality/value – The lesson-learned during this situation can be applied in other plants of the company, or in other automotive companies. The study was done based on inspection process, but the challenges described are applicable for other projects too.

Key words: Challenges, Automotive, Adaptation, Improvement, Opportunities

Introduction

The Covid Pandemic changed the face of the whole world, having a big impact on the planet, impacting the human life, industries and the economy. Among the most affected sectors, we have the automotive industry, which is one of the most dominant contributors to European economy. Automotive industry ecosystem creates a workplace for 14,6 million Europeans, representing 6,7 percent of total European Union employment becoming one of the pillars of the industries. (ACEA, 2020)

The goal of the paper is to describe the biggest challenges for automotive industry during Covid Pandemic and in the second part of the paper, the challenges of a particular case: a standardization project for a global automotive company and how these challenges were handled to progress the implementation with a positive result. Findings show how important it is to see how challenges can become great opportunities and how important it is for companies to keep improving and developing their technologies. Described challenges are a part of a study, where actual global situation of inspection process is analyzed based on different factors.

Pandemic Challenges for Automotive Industry

Covid-19 hit the automotive industry directly and the long-term effects cannot be predicted. After 2 years we are certain of a few things: taking at least six months to buy a new ordered car, even if people are insecure and they are not investing so much in luxury products, as cars.

According to a Deloitte article, "The Futures of Mobility After COVID-19" (Corwin, Zarif, Berdichevskiy, and Pankratz, 2020), four different scenarios are explored in post-coronavirus world: 1) passing storm,

2) sunrise in the east, 3) good company and 4) lone-wolves: have a three-to-five-years time frame. These scenarios are related to how things looked before pandemic in four different fields such as leadership, priority, markets and personal-data.

According to a study of PWC (2018), the biggest challenging factors for automotive industry are:

- consumer demand (risk of consumer confidence loss with negative impact revenues and profits of automakers),
- capital issues (prioritizing operational activities and thus limiting spends on R&D on other projects or innovations),
- corporate strategy (decisions about manufacturing rationalization and possible exit from unprofitable markets),
- supply chains (liquidity problems of suppliers, disruption of global supply chains and complications for entire global automotive ecosystem),
- issues of retail companies (loss of demand may impact the structure of retail sector as companies will react to market changes)

Six big challenges affect the automotive industry around the world:



Fig. 1. Top 6 challenges of the Automotive Industry (Saipriya Iyer, 2022)

Pandemic Challenges for a standardization project in an automotive company

Standardization project: Improvement of Inspection process in Hirschmann Automotive

Before the pandemic, the global automotive company started an improvement project for a process standardization. The plan of the project was to create a plan of improvements, to have a pilot-run in the Romanian plant then to implement it in all company's factories: China, Morocco, Czech, Mexico, Austria and Germany.

The project addressed is the improvement and standardization process of the final product inspection. The inspection activity is present in all Hirschmann Automotive factories since the first product is made by inspecting its characteristics. Over time, these characteristics have multiplied and diversified based

on the new characteristics imposed primarily by customers, the technologization and diversification of processes, the change of production factors, the diversification of the human factor, the implementation of new standards imposed by the field of activity, as well as other financial or cultural influences.

Inspection process refers to activity of checking the conformance of the produced products according to the customer's requirements. These activities are examining, testing, measuring or gauging, depending by type of products. The results are compared with specified requirements.

Based on these imposed changes, each factory built and adapted its sorting process to meet its own local objectives. With the development of factories and globalization, common customers began to demand the same method and approach regardless of the manufacturing plant, which led to the realization that standardization of the inspection process globally is necessary.

Starting from the idea of standardizing the product inspection process within this global company and taking into account the diversity of manufactured products, the culture of the countries they belong to, manufacturing conditions, etc. the most important step is to identify what the current situation is in each factory. For this identification, a quick action with maximum benefits would have been a visit to each factory. Unfortunately, due to the unfavorable travel conditions imposed by the Covid-19 pandemic, these very beneficial visits were impossible. Precisely for this reason, the team had to find another alternative through which they could find out information. In order to solve this situation and advance the project, the approach of a questionnaire was identified in which sorting coordinators can participate, where there are also quality managers, towards the idea of having at the end some relevant questions and answers that can be compared and used for development and standardization of the researched process. The main objective of the questionnaire is to identify using the same questions for all survey members what the current status of the sorting process in all Hirschmann Automotive plants is and in addition what are the major similarities and differences between the plants, to which is added the identification of the main need for improvement and standardization. Out of about 15 platforms checked, only two were compatible with the needs of the project, including Google Form and Survicate, most of the others could have been used after an initial payment. Of these, Survicate (<https://survicate.com/>) was chosen because although Google Form seemed easier to use, it is not accessible from the company's security platform.

The type of survey chosen is factual data, also called administrative questionnaire, through which data, situations and facts can be evaluated. To start the survey, I asked some basic questions: "Where?", "Who?", "Why?", "How?", "What?", "How much?". The next step was not to answer the questions, but to write down the main elements (resources) that lead to and answer these questions and are common to every factory regardless of the manufactured products. So, starting with these basic questions, we identified the main factors for inspection process:

- "Where?" - *Sorting area* - the place that is defined to be used strictly for this product inspection process
- "Who?" - *Human resources* - Area coordinator, if any; operators designated for inspection; the other support functions - logistics employees, quality engineers
- "How?" - *Equipment* - all material resources used: tables, chairs, boxes, lamps and special measuring and checking equipment
- *Documents* - All forms and documents used to perform the sort
- "How much?" - *Time, Costs and Reporting* - All sorting activity is perceived as a service added to the products, because it is not a manufacturing process that adds anything physically to the products, precisely for this reason, this process is "measured" by operator verification time on a specific product/quantity, then converted into costs and reporting these amounts to management and customers when appropriate.

Hello, let's improve together the system Hirschmann Global Sorting Overview	01	HUMAN RESOURCES Which is the target for sorting operators? For example, to have dedicated...	13
Short introduction Your Hirschmann Plant	02	EQUIPMENTS Do you have in the sorting area dedicated/ specially created tables/ work...	14
Short introduction Please write your name and your role in the company?	03	EQUIPMENTS What additional auxiliary equipment/ area are necessary for the sorting ...	15
How important do you think it is to have a standard sorting system in the company?	04	DOCUMENTS What are the used and dedicated documents (procedure, form, etc) used...	16
AREA Do you have a dedicated sorting/ inspection area in your plant? If yes ple...	05	DOCUMENTS Who is responsible to prepare the inspection instruction?	17
AREA Are there any products in your plant with special production conditions o...	06	DOCUMENTS How you evaluate the idea to have the digital inspection instruction, on a...	18
AREA What do you consider being the main objective/ target for the sorting/ ins...	07	TIME, COST AND REPORTING Which are the sorting results for 2021? Total costs and total sorted quant...	19
HUMAN RESOURCES Do you have a dedicated sorting coordinator? If yes, please name a few o...	08	TIME, COST AND REPORTING Do you evaluate frequently the costs of the sorting activities? If yes, how ...	20
HUMAN RESOURCES In your plant do you have dedicated sorting workers (who's main job is to...	09	TIME, COST AND REPORTING Which is the actual exit criteria for a sorting? (when a product is eliminate...	21
HUMAN RESOURCES Are the sorting/ inspection workers included in the competence/ polyvalen...	10	PRODUCTION FEEDBACK & ACTION PLAN How is the communication defined between inspection area and product...	22
HUMAN RESOURCES How have you hired the dedicated sorting operators? (example: by HR sp...	11	PRODUCTION FEEDBACK & ACTION PLAN Is there an action plan or a dedicated board on which the top failures are...	23
HUMAN RESOURCES Who is training the operators on each inspection instruction?	12	PRODUCTION FEEDBACK & ACTION PLAN Are sorting results included in any daily meeting of the management? Ple...	24
		PRODUCTION FEEDBACK & ACTION PLAN Are there any other points which you consider necessary to take in consi...	25

Fig. 2. Questions from the global questionnaire (www.survicate.com)

Following the questionnaire, except for one factory where the entire manufacturing chain is technological, and the potential for deviation from standards is minimal, all factories completed the answers to the questions.

On the first three elements: the sorting area, human resources and equipment, it is obvious that the necessity forced all factories to have these three resources available in one form or another, but enough to carry out their activity towards the fulfillment of the current objectives: sorting and delivery of compliant products to customers.

Regarding the last resources surveyed, it is very easy to see that it is not a general standard, there is no system that helps factories to firstly document the activity, and then to evaluate it, finally to improve the processes that imposes the need for sorting and which at the same time would streamline both production and the costs currently allocated by the insufficiently monitored sorting system.

Challenges of Inspection process because of Covid-19

When the pandemic started in Romania, the improvement process was only in the planning phase, and in that time we faced many challenges that will influence the project's progress in this early stage:



Fig. 3. Top Challenges for project influences by Covid Pandemic (Hirschmann Automotive)

- Travel limitations – the most important obstacle for the development of the project. For a global project, travelling in all countries to meet the project members and make an overview was considered essential.

For this limitation, online meetings were a great solution. In the company, before pandemic the online meetings were not very used as much as phone calls, emails, personal visits. Being an old company, the big step to digitalization was not considered necessary, but being the only possibility, it was warmly embraced.

- Manufacturing shutdowns -Starting with the manufacturing factories in China, all over the world, companies were closed for a period of time. These operating breaks were also present in Hirschmann Automotive in some plants, including Romania's plant. The shutdown period was not so long compared to other companies, but the insecurity in the world and implicitly in the company imposed a pause in the project until the full return of work in the factory, this it means more than 6 months of postponed timelines.
- Communication – being a global project, the common language was English. Communication is vital to develop valuable interpersonal relationships. An effective way of communicating is more than essential to develop productivity and maintain long-term relationships, communication takes place in two plans: a content plan (10%) and a relationship plan (90%) therefor travelling and binding relationships during visits were considered so essential. The language of communication is the biggest barrier in an intercultural communication, but not the most fundamental. People who do not speak the same language or do not speak the language well, may have difficulties communicating. Sometimes, even those who share the same language can understand and perceive in a different form what is spoken to them, given the experience and knowledge of the topic discussed. The equivalence of the concepts expressed can take different forms than in the communicated language, i.e. English in this case.

Following this standardization project and all the online meetings, from personal experience I can admit that without a personal knowledge of the interlocutors, without creating a small relationship, communication was difficult and often, although the discussed subject was repeated, it was still necessary to clarify the same topic at least 2-3 times to remain with the same idea all participants.

- Different time zone – The main element in a team is communication, followed by availability and being present for meetings and project progress. Time zone differences can be a major impediment if they are not taken into account when a project is planned and organized.

According to some internet opinions, the pandemic is a good reason to eliminate the different time zones. If we are thinking about globalization and communication between multiple countries, this proposal can be a good idea, but from my point of view the reasons are not enough.

No matter how important it was to communicate with the Hirschmann factories at the same time to discuss the commonalities, this was impossible due to the time zone difference. For example, the difference between Romania and Mexico is -8 hours and between Romania and China is +8 hours, in conclusion the difference between Mexico and China is 14 hours. This difference has prevented joint online meetings between factories in Europe and the other continents of the world. They ultimately affected the communication and extended the project period, as the same topics were addressed with each, as well as the questions between them. For the future, we are thinking to implement a private chat for each project where team members can leave text or voice messages to other colleagues in a simple and easy way.

A good organization, based on difference time zone in a multicultural project, can make money when you are sleeping.

- IT Resources – in addition to the standardization of the process, there was the implementation of electronic tablets at each workstation. These tablets should be used for the digitization of forms and process documents. The challenge imposed by the Covid pandemic was when we tried to purchase these electronic equipments because the brand chosen for Romania does not deliver to Morocco. This impediment could have been solved by purchasing all the tablets in Romania and delivering them to the other six Hirschmann locations in the world, but the warranty only covered Europe at best and the travel and replacement costs would have exceeded the planned costs, without considering the time spent for these movements. The consequences of these situations lead to a decrease in the company's productivity, efficiency and proposed results.

Using the presented challenges as lesson-learned for the next projects, Hirschmann Automotive or other companies can have a positive and valuable inputs for their next projects.

Discussion and conclusions

To adapt to changing and challenging times, automotive experts are required to adapt and educate themselves with the latest trends and technologies. As Joe Vitale, mentioned in an article of Deloitte, "Understanding the impact of COVID-19, Automotive sector", automotive companies should take in consideration the next practical steps to mitigate the impact of the pandemic: identification and prioritization of cost-out measures, optimization of working capital, revising forecast assumptions, prioritizing downside scenarios given the current level of market uncertainty, identifying sources of collateral and additional solutions, focusing on employee safety and care. (Vitale, 2020)

During the project directly affected by the pandemic period, several scenarios were considered, including stopping the project until the situation in the automotive industry becomes more stable. The challenges taken individually and their attempt to find suitable solutions to continue the project improved the vision and encouraged the team to progress with the new decisions, which in the end proved to be successful. Through a primary analysis of this questionnaire, the need to standardize how a sorting instruction is applied, then how the resulting data is collected, analyzed and used in action plans for improvement, is evident. The major problem in this standardization process was the application of local documents in each plant, which indirectly leads to differences in the application of methods, of different interpretation both by global management and by common customers between plants.

It is very interesting, how at the beginning we started from the premise: "how can we all do the same thing in the same way?", then after researching, developing and implementing a system, we concluded that it would be best to ask the same question in a different form, namely: "how can we accommodate the differences we know will exist anyway".

In the end, this research shows the idea that any challenge can be an opportunity if it is viewed from a different perspective with the right attitude, knowing the risks, sharing the knowledge, having an open mind and following the main purpose. Staying competitive, rethink their short-term playbook, applying lesson learned and integrating smart are only a few of the next steps for automotive industry pushed by Covid-19 pandemic.

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ONLINE TEACHING “HANDS-ON” WHILE COVID: A DIGITAL SERVICE ENGINEERING TRAINING COURSE

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Abstract

Purpose – *The idea was to deliver an academic educational online course with very practical elements during the COVID pandemic for future service engineers. The practical course module during the COVID pandemic of this project is to produce a working paper on how an online training program for a future service engineer could look like.*

Methodology - *Survey of literature and industrialists to identify essential scientific methods with practical relevance for services development.*

Findings – *A course model has been developed with a lot of “hands-on exercises which helps students to develop services in small teams online.*

Practical implications – *The developed online course model is highly practical and delivers similar results as in classroom. But a special focus is on the lecturer to always keep track on the online communication of the participants.*

Originality/value – *The course concept -originally designed for the specific COVID limitations and requirements- can also be used for all kinds of trainings with dislocated participants such as industrialists from different branches or geographically distributed students.*

Key words: *Education, Service Engineering, Online Training Class*

Transition from Traditional to Modern Business Models

Digital transformation means a re-orientation of products, services, processes and business models towards the continuously digitalised world and results in faster transactions and more reliability through quality and security and therefore leads to higher customer satisfaction. [Kreutzer Ralf T., 2017]

This is only possible, if companies can digitalise information and data about products, customers, processes and services and thereby digitally transform their business model. With this new working method, a high amount of data is collected about business procedures and production processes, customer demands, as well as data about internal and external communication, requiring a high amount of management and data analysis.

Such a business approach leads to the engineering of all kinds of industrial services (XaaS- Everything as a service). The regular pathway of transformation follows typically in three generic phases as described in Fig. 1:

Figure 1 shows the pathways towards a digital business. By this it is essential to master internal and external challenges within an enterprise. A stringent fully digital business requires to digitize both side of the interaction.

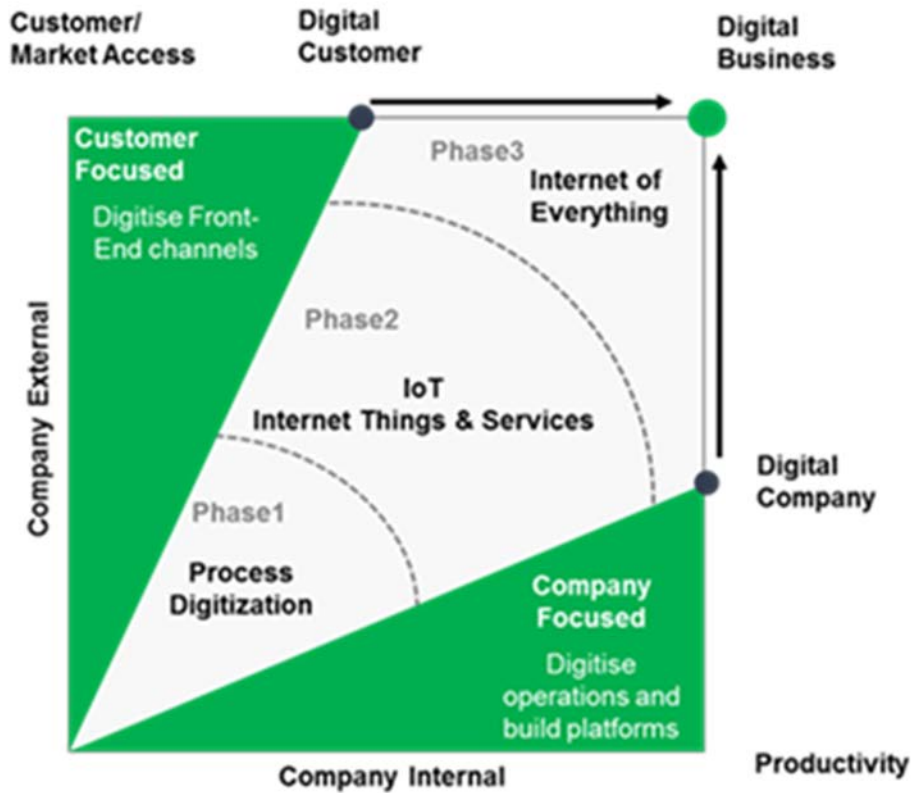


Fig. 1. Digital transformation (modified and enhanced according to [2])

This begins through the digitalisation of the channels and processes used to create or provide value. Afterwards, the digitalisation of products, services and other objects are included in the value chain. Finally, a full digitalisation of all transactions and procedures with a high automation level leads to a fully digitalised business model [Dehmer; Kutzera, Niemann, 2017].

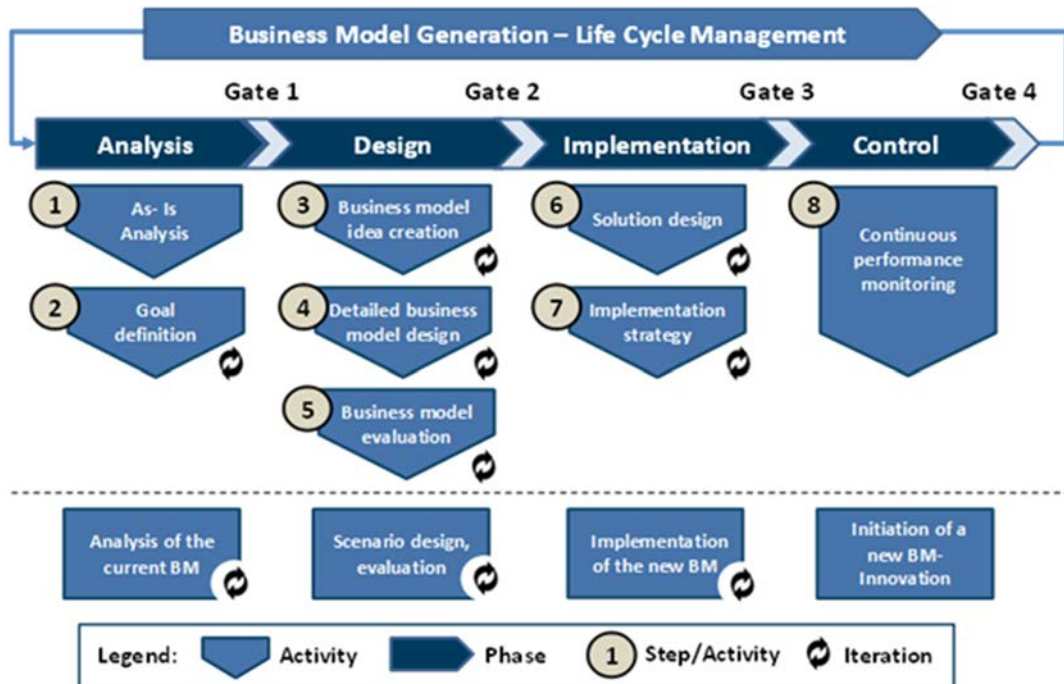


Fig.2. Process Model for Business Model Innovation (modified and enhanced according to [6])

New business models such as pay-per-use (usage-based payment e.g.: Car2go), peer-to-peer (trade between private individuals e.g.: Airbnb) or performance-based contracting (payment for the final performance e.g.: Rolls Royce) have revolutionised entire industries. Therefore, many companies have changed their model to move from pure product sales to the sale of problem solutions and services. When servitization moves a manufacturer all the way to becoming a solution provider there are major changes on the business model.

For enabling this transition, several frameworks are described in the literature [Niemann Jörg, 2016] [Niemann Jörg, Tichkiewitch Serge, 2009].

Figure 2 shows a modified and advanced model based on Bucherer [2010] which is applied for the development of a new business model on the basis of an existing model. It consists of several phases in which different activities are pro-posed. After each phase there is a gate which requires a verification, if the planned solutions and the meaningfulness of the concepts are given. When this is fulfilled the next phase starts, otherwise there is a need to start from scratch with the previous phase. This model is to be understood as a cycle and should serve to question and optimize the business model during the entire life cycle.

Methodology for Transformation

A methodology is defined as “a system of broad principles or rules from which specific methods or procedures may be derived to interpret or solve different problems within the scope of a particular discipline. Unlike an algorithm, a methodology is not a formula but a set of practices.” [Schallmo Daniel R.A., 2017]. To develop and refine the method presented in this paper, the large number of methods found in literature have been evaluated and matched with the practical experience of industrialists. This helps to increase the acceptance and practicability. [Kohne Andreas, 2020] [Niemann; Reich; Stöhr, 2021] [55 Pattern Cards, 2013] [Gassmann; Frankenberger; Csik]

On the other hand it is essential to train potential future users in the application of these methods. Therefore it was also an essential part of the methodology to simultaneously develop a training course for academics to train the required skills for later practical application when developing a “XaaS”. The target group of the dedicated training course ranges from students up to top management. This requires a modular course model according to the specific needs of the target groups. [Doleski Oliver D., 2015] [Chizzoli; Raccagni; Busacca, 2020]

Steps and methods

Phase of business Analysis

Enterprises are in general complex bodies with many elements and internal and external interdependencies. Concerning the business model transformation the following main areas must be analyzed: The own business model, the stakeholder and the external influences on the business (ecosystem). [Brugger Ralph, 2009]

Step 1 – Enterprise As- Is Analysis

A review on the existing literature lists the following methods to be the most suitable and applicable in operational business:

- SWOT [Niemann, 2016] [Niemann, Tichkiewitch, 2009] [Kohne, 2020]
- Benchmarking [Niemann; Reich; Stöhr, 2021] [Niemann; Pisl, 2021]
- Ishikawa diagram [Niemann, 2016] [Niemann, Tichkiewitch, 2009] [Fussenecker, et al., 2020]

Step 2 – Enterprise goal definition

On the top level each enterprise has defined a vision and according business goals. [Kohne, 2020] The mainly applied methods to master these essential task are according to literature:

- Goal pyramid [Kohne, 2020]
- Gap analysis [Niemann, 2016] [Kohne, 2020]

- Scenario analysis [Niemann, 2016] [Niemann, Tichkiewitch, 2009]

Phase of design

This phase deals with the methodical development of the the new business model. Today´s enterprises perform this step by installing working groups or teams. The advantage of this mode is to generate more ideas and to base all decisions on the group which leads to a better acceptance in the following implementation phase. But -of course in any case- the design of the new business odel has to be in compliance with the enterprise standards, strategy, goals and capabilities.

Step 3 - Business model idea creation

The idea finding is mostly based on creativity of the groups/teams. As previously mentioned this process step is performed under the inclusion several “internal parties/departments” to reach a maximum output of ideas and simultaneously a maximum acceptance of the found solutions.

A crucial aspect is to integrate the voice of the customer as early as possible into the process. All solutions must be re-checked with the (potential) customer needs to ensure the economic success of the later service. Most of the unsuccessful business ideas die because of the weak integration/consideration of customer needs. [Niemann, 2016]

Creative thinking methods help to design completely new business solutions apart from the existing models and current boundaries. [Barsh, Capozzi, Davidson, 2020] In literature but also in practical industrial application the most commonly used methods are “mind mapping” and “brainstorming. For operational enterprise transformation literature references the following tools:

- Destroy your business [Gassmann; Frankenberger; Csik]
- The empathy map [Chizzoli; Raccagni; Busacca, 2020]
- St. Galler business model navigator [Brugger, 2009]

Step 4 - Detailed business model design

After some ideas have been gathered, they should be thought through systematically. All aspects should be considered, to enable a holistic perspective of the business model and to ensure its functionality. For this the most proven tools used in practice are

- Business Canvas [Kreutzer, 2017] [Chizzoli; Raccagni; Busacca, 2020]
- SIPOC [Niemann; Reich; Stöhr, 2021] [Niemann, 2017a]

Step 5- Business model evaluation

The final step of the process is the evaluation of the business model. This step is rather difficult because so far there are no data available that could be used for the impact/market success evaluation or analysis of key performance indicators (KPIs). Therefore a lot of assumptions and estimations need to be made. Anyway the literature lists several tools and methods to perform such an analysis in a methodic process including internal as well as external parameters.:

- PESTEL [Barsh; Capozzi; Davidson, 2020]
- Porters five forces [Barsh; Capozzi; Davidson, 2020]
- Value benefit analysis [Niemann, 2017b]

Phase of implementation

After the final approval of the management the transformed business model (or newly developed business model) has to be rolled-out for business operation. This requires a roll-out plan that includes the targeted markets/segments, tools and responsibilities.

Step 6 - Solution design

According to several authors a successful solution design can be reached by the following tools/methods:

- Detailed process design [Niemann, 2016] [Niemann; Tichkiewitch, 2009] [Niemann; Reich; Stöhr, 2021]
- Resource & investment plan [Niemann, 2016] [Niemann; Tichkiewitch, 2009] [Niemann, Reich, Stöhr, 2021] [Niemann; Fussenecker; Schlösser, 2019]
- Business case [Niemann; Reich; Stöhr, 2021] [Niemann; Fussenecker; Schlösser, 2019] [Glauner, 2016]
- Performance management [Doleski, 2015] [Stöhr, et al. 2018]

Step 7 - Implementation strategy

Central objective of the implementation strategy is to master the transformation with a minimum of delays and downtimes. Furthermore an implementation strategy needs to describe the required resources and tools for the operation of the new services and business model. Some authors recommend to run the old and new process for a period in parallel until the new process has reached a certain stability. For the management the toolbox of project management can be applied. [Niemann; Reich; Stöhr, 2021], [Barsh; Capozzi; Davidson, 2020]

Common tools and methods listed in literature as well as in practical industrial application are the following:

- Project charter [Niemann; Reich; Stöhr, 2021]
- Action plan [Niemann; Reich; Stöhr, 2021]
- RACI matrix [Niemann; Reich; Stöhr, 2021]
- Project plan [Niemann; Reich; Stöhr, 2021]
- Transformation plan [Gassmann; Frankenberger; Csik] [Doleski, 2015]

Phase of control

As a last step it is recommended to implement a continuous and structured controlling of the implementation and market progress of the new business model. Continuous monitoring of the operational activities and financial figures allows to benchmark the actual with the planned performance. It is essential monitor the market activities and the business impact of the new business/service to identify deviations from planned business goals as soon as possible. The early identification of deviations enables an early reaction to deviations and according improvements of processes or of the product/service.

Step 8 – Continuous performance monitoring

Derived from literature and industrialists the following tools have been identified to be suitable:

- Balance scorecard [Doleski, 2015] [Brugger, 2009] [Niemann, 2017a] [Niemann, 2017b] [Glauner, 2020]
- Break even analysis [Doleski, 2015] [Brugger, 2009] [Niemann, 2017b] [Niemann; Fussenecker; Schlösser, 2019] [Glauner, 2020]
- Rolling forecast [Doleski, 2015] [Brugger, 2009] [Glauner, 2020] [Niemann; Fussenecker; Schlösser, 2019]

Development of a training program

The challenges outlined above place enormous demands on the developers of services in the future. Therefore, the goal was to develop a consistent methodology for the development of services, which takes up and implements these requirements. In this context, a training course was developed at the Flix Research Centre for Life Cycle Excellence at the University of Applied Sciences Duesseldorf. The target group of the course are engineering students and professionals (see fig. 3). The course teaches the basics of designing and developing modern services using "hands-on" training modules. The ratio

of theory and practical units/time is 30%/70%. All practical parts are group works in virtual classrooms with strong interaction and use of digital tools (e.g. for visualization, design etc.)

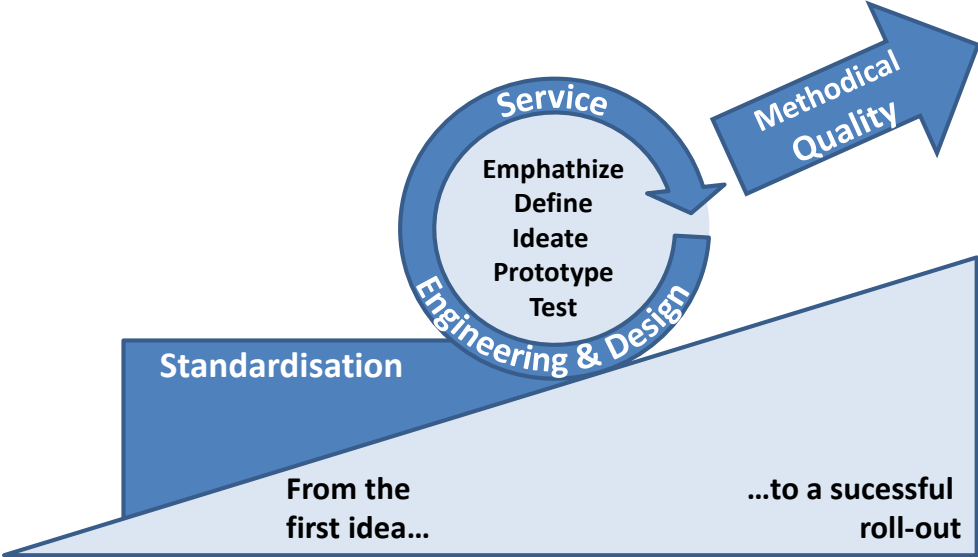


Fig. 3. Service Engineering training course [source: own graph]

<p>Day 1</p> <ul style="list-style-type: none"> • Introduction • Business Models • Principles of Service Development • Design Thinking • Problem finding 	<p>Day 2</p> <ul style="list-style-type: none"> • Emphazise • Expert Interview • Mind Mapping • Define • Persona • Presentation 	<p>Day 3</p> <ul style="list-style-type: none"> • Ideation • Brainwriting • Value Propostion Canvas • Presentation
<p>Day 4</p> <ul style="list-style-type: none"> • Prototyping • Test • Improvement • Presentation 	<p>Day 5</p> <ul style="list-style-type: none"> • 7Ps marketing for services • Tiered pricing odel • Presentation 	<p>Day 6</p> <ul style="list-style-type: none"> • Presentation Service • Course evaluation Q&A • Examination • Certificates

Fig. 4. Course content [source: own graph]

Fig. 4 shows a rough overview of the topics, methods and practical parts of the course contents.

The course participants develop and design a service step by step using methods and tools that are learned and tested within the course. In this way, the course participants simultaneously learn the

methodological tools in a creative course atmosphere according to the needs identified from the literature and the industry survey. The course lasts approximately five days. Due to the modular design of single units the course content can be extended or shortened depending on the group of participants and the objectives. E.g. students normally need more theoretical input in comparison to industrial participants who are more focused on the practical exercises.

The course ends with a theoretical (online) test and an oral presentation of the developed service. Participants will get an automated certificate in case of successful participation. By this, the course is not only suitable in a face-to-face but also in a 100% online format. However, experiences before COVID 19 always stated that face-to-face formats are advantageous in situations of group works. The found mode via web allows to include a large number of group works into virtual rooms. After two years of training the authors observed a "getting used to" handle meetings in virtual rooms. Essential is to always trigger communication among the participants and to motivate them using digital tools for their work. The course language and the teaching materials are in English so that the course meets industrial standards and is not open for an international "roll-out" among students and industrialists.

Summary and outlook

The paper describes a process and a toolbox of methods for the digital business transformation. To gather the steps and to form them to a process a literature review has been executed to identify methods used in literature and industry. According to the findings FliX research centre has developed a certified training course in the field of service engineering for students and business professionals. The methods and processes found formed the basis for the elaboration of an academic training course in the field of service engineering. The course has been initially designed to bridge the COVID situation with the legal arrangement of distance learning in German universities. The course contains theoretical and practical knowledge of service engineering and includes more than 70% of practical group works. So far more than 60 students have participated in the course. Initially designed for the pandemic situation the course is now open for "transfer". The online mode with group works in virtual classrooms can be easily transferred on an international level with partners and participants from all over the world. Besides looking for a suitable funding possibility, recommendations for further adjustments are welcome. A proposal is to set up a new online and onsite class to train the future European service engineers within a network of interested universities.

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CASE STUDY ON THE CONSEQUENCES OF THE PANDEMIC ON THE SPECIFIC RISKS OF A PATHOLOGICAL ANATOMY SERVICE IN ROMANIA

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Abstract

Purpose – The good management of these risks, as well as the supported control, aim to make the specific activities of pathological anatomy services more efficient by identifying the incidence and factors that can create managerial risks and lead to unfavorable events or consequences.

Methodology/approach – The research presents an approach to a less investigated field from the point of view of managerial risks. The approach is theoretical and at the same time practical through a case study.

Findings – The observed changes had a direct effect on the patients but also on the medical staff.

Limitations/implications of the research – The present research was carried out in a pathological anatomy laboratory within a public hospital in Romania

Originality – Realization of an original synthesis regarding the managerial risks specific to a pathological anatomy service, which represents a novelty in the field of knowledge at the national and European level.

Key words: risk, management, pathological anatomy

Introduction

Managerial risks in pathological anatomy services in public hospitals in Romania represent the important factor in the management of medical and sanitary activities as well as in pathological anatomy services.

The good management and control of these risks are aimed at streamlining the specific activities of pathological anatomy services by identifying the incidence and factors that can create adverse events or consequences.

Of course, the Covid 19 pandemic has strongly affected the working capacity of these services and the research on how the awareness of managerial and clinical risks has influenced or not the activity of pathological anatomy laboratories is a strictly current topic and the new data created by this situation changes substantially knowledge and working methodology in case of unwanted events.

The present research carries out a theoretical analysis of all the managerial and clinical risks identified in the pathological anatomy services in the pre-pandemic, pandemic and post-pandemic periods and highlights, through a case study at a specialized unit, the practical methods adopted by the leaders of the health units and of the managers of pathological anatomy laboratories to ensure the functioning of the respective services within the parameters.

In the post-pandemic context, one can observe a much deeper interest in the management of managerial risks, which have affected this segment of medicine, and the adopted measures present a reorientation towards a technological, qualitative but also economic reconfiguration, due to the awareness of the much more complex specific environment, changeable, often unpredictable.

Research methodology: the research carried out by the authors represents an approach in a less investigated field from the point of view of managerial risks, however, and in which the pandemic

condition has had a strong impact. The research methodology is based on two components: one based on a theoretical study from the specialized literature on the consequences of the pandemic in health, and one in which a case study is carried out on the managerial methods adopted in a specialized unit.

The theoretical study based on documentary research on the consequences of the Covid-19 pandemic in the field of health

The influence of the pandemic on the health system, a significant factor in the evolution of the public health system.

The pandemic that hit worldwide demonstrated that the limits of the health system could be exceeded, and all efforts of any kind, whether human or material, led to its reinvention.

Although the health systems, regardless of their nature, some more performing, which adapted to people's needs, others did not overcome their condition of "primitive systems", all were put in unprecedented situations, and were obliged" to adapt to the new medical emergency requirements.

Being an unprecedented situation, involvement and sacrifice had a decisive role, elements that characterized the factors involved. In this context, numerous public and private entities took part in the fight against the pandemic: starting from high-level involvement - governments, respectively the sustained interest of EU states, to industry, the medical, scientific field, research and ordinary citizens, they all put in immeasurable efforts.

The pandemic situation has visibly influenced society, but the center of gravity was the health system that was taken unprepared and that brought to light the disastrous situation that dates back decades and that health reforms seem to not exist.

At the global level, solidarity is the key word, the World Health Organization, together with the EU and all the other countries of the world, had an exceptional collaboration, and which set in motion all the instruments to combat this crisis.

It is known that the coronavirus pandemic was a real threat at the global level to the health of the population as well as at the financial, behavioral and why not change of mentality and priorities, in other words, the "Coronavirus" affects social security.

With all the efforts made by world public entities, in combating the terrible disease, several successful models have been marked on the "pandemic map", such as that of: China, Germany, South Korea, but it is also worth noting the Swedish model which approves of the casual distancing in which society is not corseted. About the terrible disease, both the international mass media and the written press emphasized the aggressiveness of the virus and that this disease is considered an emergency, but also how unprepared the health system was, including the Chinese one, as reported in an article published in the American Journal of Public Health (Bouey, 2020).

I.Chifu (2020), shows that it occurs as sudden movements of evolution which of course is perceived as a threat in terms of basic values;

The Journal of Asian Finance, economics and Business, highlights through an empirical study, the major changes in the purchase of medical products during the pandemic crisis, "the trend towards the marketing of health products to increase public attention to health values has increased during the Covid-19 pandemic". (Hidayat, Wibowo, Gunawan, Dewi, Wijayaningtyas, 2021)

A major contribution was made by all the states of the world in the management of the pandemic in which the decision-makers had an unexpected involvement in the good sense of the word, and this emerges from the work of E. Anatol (2012) The concept of global health from the perspective of the globalization phenomenon.

There are many critical voices that show us how the health crisis generated by Covid-19 has revealed the incapacity of international governance, starting with the WHO. (Dutu, 2022)

In all this maelstrom, in which no one knew what tomorrow would bring, important leaps were also highlighted, such as that of the digitalization of the medical field, more correctly said, the pandemic helped the evolution of digitalization in the health field. However, the pandemic had a motivational role

regarding the transition from a poorly computerized health system to a system compatible with the latest, D. B. Abrudan (2022) in the work "Elements of leadership in medical services" (Abrudan, Boşcai, Popovic, 2022), suggests that the adoption of the smart hospital model, where the patient finds himself in harmony with modern technology, would be indicated.

In the specialized literature, numerous articles have appeared in which the factors that have negatively influenced society are presented. Among these factors, we can primarily highlight the stress factors and their consequences, including at work, and here I am referring to the medical body in particular, which not infrequently led to the onset of burnout syndrome. This pandemic affected the entire social system rapidly, the transmission route being airborne, they affected many lives, as reported by J. Marwha and K. Shah (2022).

Also in this way remarkable efforts have been made to find the right treatment, including the testing of some drugs, this is evidenced by numerous international papers.

Classification of managerial and clinical risks in the Pathological Anatomy laboratory

Risk, condition sine - qua - non!

According to L. Marian (2001), "the risk as the possibility of an unwanted event with a multitude of consequences", which harms the person, either patient or medical staff, we can draw the conclusion that risks in hospitals derive from certain situations with triangular configuration that targets both procedural/medical technology, relational/human and managerial space.

The realization of a coherent management in terms of risks does not mean only the simple inventory of risks, but involves a series of technical-managerial maneuvers based on specific techniques that require prior analysis of everything that means exposure to risk, and the origin of the specific management these situations represent the identification of risk sources.

The identification of risks stipulated in the Risk Management Methodology, represents the primary condition, is to define the level of risk tolerance, assess the probability of risks, establish the impact and exposure to risk, and finally to establish and adopt the appropriate strategy.

This scientific approach, originating from the competitive economy, is also successfully applied in health, respectively in pathological anatomy services. Of course, being a hospital environment, all the focus falls on the medical act, which has certain well-established procedures and for which the risk categories are identified clinical, but should not be ignored the activities of management, planning, organization, management and control of medical units that have a major impact on the final results and the successful fulfillment of the system's objectives.

Pathological anatomy being a laboratory where the histopathological diagnosis is awaited with major emotions and great interest by the patient, tends towards a real "emancipation" which can be defined as a self-overcoming, a progress, a reinvention in front of the patient by introducing some parameters of professionalism, accuracy, promptness and efficiency. All these parameters are dependent on a more comprehensive awareness of the managerial risks specific to health facilities both in normal periods but especially in crisis ones. Thus, following the theoretical research carried out, it is highlighted that in pathological anatomy services there are risks falling into two categories, clinical risks and managerial risks.

Clinical risks specific to pathological anatomy services (adapted from V. Cepoi)

A cataloging of clinical and professional risks was carried out by V. Cepoi (2017), it shows that the health sector, being one of the largest sectors of activity in Europe, employs approximately 10% of EU employees, where the frequency of work accidents is somewhere at 34%. Of course, any healthcare unit with a well-developed management wants to increase patient safety, it is based on the management of clinical risks that are generated primarily by the quality of medical procedures and their compliance. (Cepoi, 2017)

Clinical risk is an unwanted event directed at the patient and affecting the patient's interests. These risks categorically influence:

- Extending the duration to receive a histopathological diagnosis;
- Aggravation of the patient's health condition;
- Inability to overcome the disease state;
- Prolongation of the illness;
- Death of the patient.

In this table (table no. 1) the clinical risks mentioned by Cepoi (2017) and found by the authors of the paper in the pathological anatomy services in Romania can be found in the categories that the present paper only names.

Table no. 1. Classification of risks in pathological anatomy services - Adaptation of clinical risks according to V. Cepoi

Risk	Clinical risk
Risk of misidentifying the patient	The risk of worsening the mental state of patients/relatives
The risk of not being able to transport biological samples correctly	The risk of damaging the biological sample; -The risk of damaging the accompanying documents; - The risk of not receiving the results on time
Risk of not being able to release paraffin blocks and slides	- The risk of having no concordance between the initial result and the one released at the 2nd opinion
The risk of employee illness	The risk of staff illness;
Risk of personal injury	The risk of staff illness;
The production of biological waste (fluids, tissues, human cells and organs) and chemical waste (formalin, alcohol, xylene, etc.)	The risk of staff illness;
The risk of having unsatisfied patients	The risk of having untreated patients
The risk of finalizing the histopathological results outside the deadline provided by law	The risk of worsening the disease; The risk of complications; The risk of death
Risk of mishandling biological samples and accompanying documents	- The risk of illness and injury
The risk of misunderstanding the employee-patient (belonging) message,	- The risk of worsening the mental state of patients/relatives
Risk of providing data without consent or legal approval	- The risk of not contributing to the patient's mental well-being
The risk of drafting and drafting documents erroneously	- the risk of wrong treatment
The risk of entering incorrect or delayed data into the computer system	- treatment delay
The risk of not having a consistent supply	- The risk of not receiving treatment on time
The risk of misunderstanding between hospital structures and departments	The risk of not receiving a timely diagnosis or treatment
The risk of wrong entry in the registers	The risk of prolonging the patient's illness
The risk of not understanding and misapplying the procedures	The risk of prolonging the patient's health
The risk of not having enough human resources	- The risk of prolonging the patient's illness
The risk regarding the impossibility of obtaining authorizations, approvals, membership certificates	- The risk of prolonging the patient's illness due to the impossibility of processing biological samples
The risk of not having funding	Risk of worsening patients' condition while waiting for service funding
The risk of not having service contracts	The risk of not receiving treatment on time
The risk of not having materials/reagents, etc. permanently in stock	The risk of not receiving treatment on time The risk of aggravation of the disease
The risk of exceeding the expiration date of the materials	The risk of not receiving a result on time The risk of receiving an erroneous result
Risks due to management factors	The risk of not receiving treatment on time The risk of aggravation of the disease

Risk of receiving reagents and dyes with reduced shelf life	The risk of receiving an erroneous result
Inconsistency between the products requested and those received	The risk of not receiving a timely diagnosis
Damage to the deceased due to transport or storage conditions	The risk of worsening and aggravating the mental state of the members

Managerial risks specific to Pathological Anatomy Services

Risk management in the healthcare system is used with the aim of organizing, coordinating and controlling the units providing medical services, so that they fulfill their predetermined objectives under conditions of managerial efficiency and effectiveness.

The managerial risks found in pathological anatomy services can be legal, IT, human resources, technical, labor protection, etc. And their nature, content, manifestations and incidence were presented in detail following the research undertaken by the collective in works that were published.

Synthetically, the managerial risks specific to a pathological anatomy service are presented in table no. 1 an original synthesis made by the authors of this paper, a novelty in the field of knowledge at the national and European level.

The analysis of managerial risks requires special attention on the part of any researcher or manager, because it has been observed that over time there are numerous changes in generating factors, intensities or atypical manifestations that can have positive influences on the management activity of the health unit, embodied in „ the well-being of the patient" but others, due to some negative consequences, must impose increased vigilance and an appropriate reactivity capacity at the level of decision-makers. These changes often require an action to reconfigure activities from a managerial, economic-financial point of view or a remodeling at the level of human resources on the beliefs and behaviors of medical personnel.

Case study on the influence of the pandemic on managerial and clinical risks and measures to prevent or eliminate risks in pathology laboratories

The Pathological Anatomy Service represents an interconnected branch of the health system, an indispensable link that ensures the histopathological diagnosis, an important diagnosis in the establishment of subsequent therapies.

Pathological anatomy" consists of medical activities according to operational procedures and standardized work protocols, which consists in the macroscopic and microscopic examination of biological products from both inpatients and outpatients, as well as from deceased persons.

In Romania, according to the legislation, every hospital unit with beds, be they municipal or county hospitals, is obliged to have a pathological anatomy service.

The present study was carried out in a pathological anatomy service in a health unit located in the Central area of Transylvania and whose beginnings are closely related to the establishment of the Institute of Medicine and Pharmacy in Cluj-Napoca. More precisely, this service was established in the form of a laboratory about 70 years ago, with elite professors at its helm.

This service falling within the legislative patterns, thus fulfilling the criteria of good functionality, can be found on the map of the top specialized services in pathological anatomy in Romania.

Being a modular hospital, the Pathological Anatomy Service has its location in a central area with extended addressability, containing only two compartments in the present location, respectively, the histopathology compartment and the cytology compartment, and the Prosecution compartment being located within the premises of a hospital that owns sections such as surgery and ATI, operating on the basis of some functional circuits, which are approved by the management of the health unit, respectively the SPIAAM Department.

These circuits have the role of providing a good functionality of the activity and at the same time of protecting the medical personnel as well as the patients - the circuit of the employed personnel, the circuit of biological samples, the circuit of waste from medical and non-medical activities, the circuit of specific documents, the circuit of underwear.

From the point of view of human resources, a total number of 25 employees work in this laboratory, of which: 6 doctors, of which 5 are doctors with clinical integration, having university degrees as lecturers and university professors, are specialized in different pathologies, following different courses on different pathologies, and their presence at various national and international scientific events, does nothing but enrich their knowledge, which they later put at the service of the patient, 8 laboratory assistants, 2 autopsies, 2 registrars and 2 cleaners.

The technology and the activity carried out at the level of the Pathological Anatomy Service

The equipment and instruments provided are specific to this branch of medicine, including equipment intended especially for service departments.

Like any activity that takes place in a public institution, the activity of the pathological anatomy service is carried out on the basis of system and operational procedures, in which the performance indicators are stipulated, which, by reaching them, reach the standards that each patient is empowered to meet have:

- The ratio between registered cases and those handed over to the owners;
- The ratio between registered and deceased cases;
- The time elapsed from the patient's death to the release to the next of kin;
- Respect by the health personnel of the procedure related to the transport and delivery of the deceased to their relatives;
- Completing and correctly registering transport documents;
- Numerical records of notifications;
- Numerical records regarding the management of the deceased.

Pandemic influences in the pathological anatomy laboratory

The changes generated by the pandemic were highlighted by the modification of the "daily lifestyle" of the laboratory, by the new measures taken at the health unit level. These strict measures were imperatively needed and implemented to limit the spread of the disease.

Specifically, mandatory measures were implemented at the laboratory level as follows:

Measures related to the category of procedural risks:

- Application of special instructions dedicated to health personnel;
- New instructions aimed at carrying out the activity during the pandemic, which mainly refer to:
 - o hand hygiene, mandatory use of protective clothing and protective equipment;
 - o Mandatory triage by checking the body temperature, drawing up a standardized form specifying certain parameters of the state of health and recording it in the Epidemiological Triage Register;
 - o Mandatory distancing at work.
- Drawing up or applying specific procedures;
- drawing up new system and operational procedures specific to the pandemic situation;
- Preventive measures and elimination of risks;
- The introduction of special procedures regarding the "Prosecution" compartment
- Ex. P.O. on the management of deceased patients at high risk of infection, with immediate applicability for SARS CoV - 2 virus infection.

Measures related to the category of economic risks:

- Changes related to the prioritization of purchases.
- Focusing procurement on hygiene products and protective equipment
- Equipping the Inquest department with modern medical equipment - mortuary refrigerator with four seats for deceased non-covid patients
- Equipping the Prosecution department with a refrigerated train in order to store deceased Covid-19 patients.

Measures related to the category of technical/technological risks:

- The computerization of the service through the transmission of intra-hospital documents through modern information systems, thus saving both the patients and the medical staff from unnecessary trips, emphasizing the fact that the new circuit of documents constitutes a strong point in efficiency.

Measures related to the category of legal risks:

- Implementation of new legal norms, methodologies and instructions, issued by competent bodies

Preventive measures and elimination of risks:

- Compliance with all circuits both at the laboratory level and at the sanitary unit level;
- Modification of the work schedule with hourly spacing;
- Temporary suspension of the Duty Report and other scientific events;
- Temporary isolation of employees with suspicious clinical manifestations indicating infection with the SARS CoV-2 virus;

Following the study carried out in the present laboratory, it can be noted an essential change in the way the laboratory worked, better said, this change negatively influenced both the patients and the medical staff. Thus, the following aspects were highlighted at the level of indicators:

- the considerable reduction of histopathological cases from the hospital wards, this is due to stopping hospitalizations in clinical and non-clinical wards, but a notable thing is the increase in deaths caused not only by the virus, but also by pathologies that were not treated in time and were postponed, this aspect can be observed in table no. 2. which shows us a picture of the frequency of cases in day and continuous hospitalization in the health unit.

Table no. 2. Analysis of the cases investigated in the analyzed service

Year	Day hospitalization	Continuous hospitalization
2021	267,410.00	575,740.00
2020	135,910.00	449,850.00
2019	366,840.00	841,390.00

If we analyze the ratio between the cases registered (processed) in the pathological anatomy service and those who died according to table no. 3, we will be able to practically demonstrate the influence of the Covid-19 pandemic on the activity in the laboratory, in which it is evident that the number of histopathology cases has decreased drastically compared to previous years, but at the same time the cases of death have increased.

An aspect that can be perceived as positive is the granting of incentives for the period of the state of emergency due to the pandemic and which came to support the health personnel, being the risk incentive according to art. 8/ O.U.G. no. 43/2020 for the approval of some support measures settled from European funds, as a result of the response to Covid-19, during the state of emergency, amendments and additions through O.U.G. no. 64/ 2020 in which the personnel who managed the cases of Covid-19 death were remunerated with an amount of 2500 lei.

Table no. 3. Analysis of histopathological cases and deaths during the pandemic

Year	Histopathologic al cases	Death cases
2018	8135	514
2019	8294	594
2020	4286	619
2021	6042	659

It should be mentioned that, since the staff of the pathological anatomy service is not regulated by the number of cases, we can say that there were no negative influences during this period.

It is obvious that with the onset of the pandemic, the factors that contributed to the success or failure of the response to this "pandemic crisis" were highlighted. Although this pandemic has been a test of resistance in which human dignity has been put to the test, in which some voices of public opinion are questioning, for example, the quarantine is fully justified from the point of view of human rights.

At the level of the branch of pathological anatomy, during the pandemic, certain changes were observed that affected both patients and health personnel. All these changes in structure brought consequences of insecurity and dissatisfaction for patients and medical professionals in which clinical risks experienced an increasing dynamic. The presence of seasonal fluctuations in which the cases of death increased alarmingly and the cases of surgical treatment of some patients were downright suppressed, contributed to the modification of the map of clinical and managerial risks.

It is easy to understand that in extreme situations, the best measures to protect health must be imposed. Following the analysis, we identified both negative and positive experiences. Among the negative experiences following the activity carried out in the pathological anatomy laboratory, we mention the following:

1. the imposition of distance between medical personnel at work and the establishment of home isolation of some employees following infection with the SARS CoV-2 virus, which led to a reduction in the number of personnel, making the work process more difficult;
2. the physical and mental overwork of the staff in the Prosecution department, due to the numerous cases of deceased patients;
3. Exposure of medical personnel to the possibility of infection with the SARS CoV - 2 virus;
4. Considerable reduction of cases resulting from surgical and non-surgical interventions;
5. The alarming increase in the number of deaths;
6. Estimating the need for materials in order to manage the activity of managing deceased patients presents difficulties;
7. Pressure on the medical staff from the relatives.

Positive experiences:

1. Use of the computer system at maximum capacity regarding the route of documents;
2. Obtaining funds for the purchase of sanitary materials;
3. Financial benefits of medical personnel directly involved in the management of deceased patients;
4. Greater attention to the use of protective equipment;

As a result of the blockage regarding access to medical care in which many social inequities were identified, the impact of the pandemic on the health system was unprecedented, moreover in all medical sectors, including it left its mark in the pathological anatomy laboratory.

In this context, I propose that in the future, taking into account the good progress of the laboratory's activity, the intensification of the activity in the IT field, by expanding the IT system and in the technical area of processing biological samples, as well as the correct use of protective equipment within the service.

Conclusions

Following theoretical and applied research, we can observe certain changes that have affected both patients and health personnel. All these changes in structure brought consequences of insecurity and dissatisfaction for patients and medical professionals in which clinical risks experienced an increasing dynamic.

Thus, following the theoretical research carried out, it is highlighted that in pathological anatomy services there are risks falling into two categories, clinical risks and managerial risks.

The managerial risks specific to a pathological anatomy service have been brought to light and are presented in this paper in the form of an original synthesis made by the authors of this paper, representing a novelty in the field of knowledge at a national and European level

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IDENTIFICATION OF KNOWLEDGE LEVEL AIMED TO MANAGEMENT OF EMERGENCY STOCKS IN PUBLIC HEALTH UNITS, THE BASIS OF A TIMELY PREPARATION FOR PANDEMIC PERIODS

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Abstract

Purpose –Development of a practical guide for planning and carrying out the processes of making emergency stocks, for the public health units in Romania, in order to identify and implement good practices within them.

Methodology/approach - The research methods that will be used are the study of the specialized literature, the survey, the case study.

Findings – The importance of this topic can be justified at least by the following arguments: contributes to the development of the state of knowledge in the management of emergency stocks in public health units, having direct implications on their performance management;

Research limitations/implications – the lack of openness of the personnel directly involved, in the official recognition of the difficulties encountered during the pandemic, related to stock management.

Practical implications – Theoretically, through this paper I want to bring more knowledge regarding the definition and analysis of methods for efficient planning of stocks for a pandemic context of health units..

Originality/value – I can say that this work is both valuable and original because the claims are not just theoretical. The main author of this paper is not just a theoretician, but a man who worked in the health system during the pandemic, and his work involves exactly ensuring the supplies needed by the medical staff.

Key words: Stock management, Guide, Good practices.

Introduction

The motivation for choosing this topic was the desire to identify ways to streamline stock planning activities, respectively the supply process of public health units in Romania, which faced a number of shortcomings in securing stocks of protective equipment, disinfectants, basic medical devices and in vitro diagnostic medical devices in the context of the pandemic. These problems were caused by the lack of a legal framework or guidelines, dependence on imports from Asian countries, but also by the lack of effectiveness and efficiency in the supply processes and the establishment of emergency stocks. By designing a system to integrate organizational objectives with the activities and costs of products and services, I want to present the impact of the information obtained on the efficiency of cost management, inventory, resource allocation and / or process efficiency.

The motivation and importance of this work comes precisely from the perspective of the less happy experiences lived practically in the public health units in Romania, in the context of the two years since the beginning of the COVID crisis 19.

Among the priorities of the work from the point of view of stock management, is the definition of a way to develop the necessary protective equipment, disinfectants, basic medical devices and in vitro diagnostic medical devices for a pandemic context of public health units, and the performance of

processes supply in public health units, which is a priority area but also a dynamic one, and whose main objective must be to bring added value.

The subject of the topic is motivated firstly by the fact that an efficient planning of the needs, respectively of the supply process of the public health units in Romania must be placed in the present pandemic and post-pandemic and economic context, and secondly for efficient use. of public funds.

The context of the work

At the beginning of the Pandemic, public hospitals in Romania carried out their activities according to the specific legislation from that date. This did not require the existence of personal protective equipment (PPE), disinfectants and basic medical devices in emergency stocks. Moreover, the onset of the Pandemic in Romania, which took place at the end of February 2020, the beginning of March 2020, when the public hospitals in Romania had not concluded financing contracts with the Health Insurance Companies, and according to the legislation, the funds used were at the level of 1/12 of the contract concluded last year, but with some prudence in committing expenses. Thus, even from the point of view of financing, at that time, the public sanitary units did not have the possibility of creating emergency stocks. In a public hospital and not only, before the onset of the Pandemic as protective medical materials and devices, protective gloves (sterile examination and surgical), disposable caps, impermeable visitor gowns, impermeable sterile gowns (mainly in OR), disposable surgical masks. The need for medical protective materials and devices, disinfectants and in vitro diagnostic medical devices (SARS COV2 tests), has increased significantly both in quantity and in the range of products. Moreover, the Asian market being almost closed, these materials, as well as the medical devices used in the treatment of patients, were completely absent. A supply bubble has been created, but also an speculative bubble. All this, as well as the little information about the SARS Cov 2 virus, created a panic among medical professionals and auxiliary medical personnel.

The objectives of the paper

To this end, this paper has the following specific objectives:

1. Carrying out an analysis of the existence of the necessary emergency stocks in a pandemic context and recommendations for the improvement of good practices in their realization;
2. Identifying and implementing best practices for planning for emergency stockpiles in a pandemic context;
3. Development of a practical guide for planning and carrying out the processes of making emergency stocks, for the public health units in Romania, in order to identify and implement good practices within them.

General aspects and theoretical foundations regarding the establishment of emergency stocks

According to Law No. 95/2006 Republished on health reform, the manager of a health unit is the one who makes the resources of an organization turn into results. And one of the most important roles of a manager is to make decisions. The use of a practical guide for making emergency stocks, for public health units in Romania, can be used in the decision-making process.

The manager must be effective and efficient. It has to do exactly what it has to do, namely to use resources as economically as possible. According to the specialty literature, effectiveness is more important than efficiency.

According to the provisions of Law 98/2016, the Annual Public Procurement Program must take into account the objective needs and their degree of prioritization. Within the public health units, according to Order no. 921/2006 for establishing the duties of the management committee within the public hospital, the management committee elaborates, analyzes and proposes for approval to the manager the development plan of the hospital during the term of office, based on the written proposals of the medical board, the project of the hospital's income and expenditure budget, in compliance with the population's medical service needs, the development of medical technologies, guidelines and medical practice protocols.

A major importance in the correct conduct of public procurement during a budget year is the planning of the procurement process. If this planning process is not carried out properly, it can generate deviations from the legislation, errors and problems in the stage of the award procedure and in the implementation of the contract.

At the same time, public procurement, at the level of contracting authorities, is also associated with the acceptance of a managerial function in the context of Law no. 98/2016, since:

"The notion of acquisition should be interpreted, in a broad sense, as obtaining benefits from the works, products, services in question, without necessarily implying a transfer of ownership to the contracting authorities" (paragraph 4 of the Preamble of Directive 2014/25);

Public procurement plays a key role in the strategy "Europe 2020, A European strategy for smart, green and inclusive growth [...]", representing one of the tools to be used to achieve smart, sustainable and inclusive growth, while ensuring while the most efficient use of public funds." (paragraph 1 of the Preamble of Directive 2014/25).

Public procurement is used at contracting authority level for the application of national policies in certain areas, in order to achieve objectives established through national/regional/local strategies.

Planning the procurement process is crucial. Failure to do so causes errors and problems in the awarding procedure stage and in the implementation of the contract.

The methodology of implementing a practical guide for making emergency stocks, the integration of the information provided by a practical guide for planning and running the procedures for making emergency stocks, in the planning, budgeting and forecasting processes, quantifying the impact generated by the application of a guide, it can represent one of the tools that must be used to achieve intelligent, sustainable and favorable growth, ensuring the most efficient use of public funds.

The methodology of applying a guide to making emergency stocks

The general purpose of the practical guide for planning and carrying out procedures for the realization of emergency stocks is to establish the way of carrying out the activity, the departments and the persons involved, to give assurances regarding the existence of the appropriate documentation for the performance of the activity, to ensure continuity the activity, including in conditions of personnel fluctuation, to support the audit and/or other competent bodies in audit and/or control actions, and the credit orderer, in making the decision.

The specific purpose of the guide is to establish the necessary documentation and stages for the preparation under legal conditions and in compliance with the legal deadlines for the realization of emergency stocks.

If we were to define this Guide, we can say that it describes the activities that must be carried out within public health units, related to the elaboration in conditions of legality, regularity and in compliance with the legal deadlines for planning and carrying out the establishment of emergency stocks.

In its contents, it is necessary to find the list of the main activities that depend on and/or that depend on the activity of planning and carrying out the establishment of emergency stocks, the departments providing data of the activity, the departments benefiting from the results of the activity, the departments involved in the activity process, legal regulations, responsibilities, required resources, process diagram and deliverables.

It is of major importance to establish a Commission at the level of the health unit made up of professionals from the following fields: doctors and epidemiologists, laboratory assistants, infectious disease specialists, ATI, economists from the finance, supply and procurement departments, as well as lawyers. The role of this committee is to establish the Nomenclature of emergency stocks and the quantities required for a period of at least 60 days, depending on the capacity of the unit and its specifics. So that, at the initiation of the process of planning and carrying out public procurement procedures and the supply process, the head of the internal department specialized in procurement, who submits an administrative document in the first month of the last quarter of the year for the following year, requesting the start of the procurement process elaboration of the Annual Public Procurement Strategy, this Nomenclature can be submitted.

The substantiation of the Product Nomenclature within the guide for making emergency stocks

As we have shown previously, the need for protective medical materials and devices, disinfectants and in vitro diagnostic medical devices (SARS COV2 tests), has increased significantly both in quantity and in the range of products. Stocks in public health facilities could not cover the need. Thus, the central public authorities requested from them a series of daily and weekly information/reports, in the form of the attached tables.

Tables 1, 2 and 3 represent the situation on the first date reported by a regional hospital, to each authority. The most representative data are those presented in table 4, where we can see the low percentage of coverage of the estimated needs for a period of 45 days, on March 30, 2020. Thus, for the category Individual medium protective equipment for staff (gowns) the need was covered in a percentage of 14%, for the category surgical masks - 10%, FFP masks - 2%, surgical and examination gloves - 60%, coveralls - 7%, underwear - 0%, hand sanitizer by rubbing - 8%, Hand sanitizer by washing – 41%, chlorine disinfectant – 10%. To highlight these percentages even more, if we look at the existing quantity of surgical masks in stock, namely 20750 pieces, and relate it to the number of employees at that date of approximately 4300, but also to the indications of the number of hours of use of surgical masks between 4-8 hours, we can conclude that the situation did not look good at all. In the next 30-60 days, the situation of the supplied quantities did not undergo major changes, and the existing stocks were running out. Therefore, for a good management of stocks, it was decided to make users responsible, by introducing registers to record the use of three types of protective equipment, highlighted in table 4.

Prior to the onset of the pandemic, the average monthly consumption of surgical masks in the mentioned hospital was 20,000 pieces per month, sterile gowns 5,000 pieces per month, examination gloves 400,000 pieces per month. The supply of these products is normally made in the last week of the month for the following month. For overalls and FFP2 masks, for example, before the onset of the pandemic, there was no need for these products. If we compare the average monthly consumptions in the pre-pandemic period, with those needed since the beginning of the pandemic, we easily notice that the need has increased at least 6 times.

On 29.03.2020, the Ministry of Health issued Order 533, published in MO PI 263/2020-03-31, regarding the approval of the Plan of measures for the preparation of hospitals in the context of the COVID-19 coronavirus epidemic and the List of support hospitals for patients test positive for the SARS-CoV-2 virus. In its content, there were also Regulations regarding personal protective equipment (PPE):

"1. The recommendations "Rational use of PPE in the context of COVID-19", a document developed by the National Center for Surveillance and Control of Communicable Diseases within the National Institute of Public Health together with the Association for the Prevention and Control of Nosocomial Infections, according to the recommendations of the World Organization, are considered minimum criteria of Health in the field (Interim Guidance February 27, 2020). 2. A documented training, as well as a practical one, will be carried out with all personnel for the appropriate use of personal protective equipment. (...) VI. It will be ensured that the icons on the website of the National Institute of Public Health (www.insp.gov.ro) related to the infection of COVID-19, posted under the heading " Information for medical personnel". Rational use of personal protective equipment in the context of the COVID-19 infection. ARE YOU COMING. Preventive measures in the context of COVID-19 Based on the available evidence, the SARS-CoV-2 virus is transmitted from person to person by direct contact and by Flügge droplets. People at greatest risk of infection are those who are in direct contact with a patient with COVID-19 or who care for patients with COVID-19. Prevention and limitation measures are essential both in the field of medical assistance and at the community level. The most effective preventive measures for the community include: - frequent hand hygiene with a hydro-alcoholic rubbing solution if the hands are not visibly dirty or with water and soap if the hands are dirty; (...)Medical personnel must apply additional precautions to protect themselves and prevent transmission during medical care. Precautions to be taken by medical personnel caring for patients with COVID-19 include using PPE appropriately; this involves both the selection of appropriate personal protective equipment and its appropriate fitting and unequipment. Recommendations for optimal use of available personal protective equipment.

Table 1

County	Unitate sanitară	Products											
		Surgical masks		FFP2 masks		FFP3 masks		Protective overalls		Biocides TP1 (personal) I		Biocides TP 2 (surfaces) I	
		a	b	a	b	a	b	a	b	a	b	a	b
	20,300.00	20,300.00	-	-	189.00	189.00	189.00	189.00	2,085.00	2,085.00	2,085.00	2,085.00	5,177.50

a) existing in stock on 21.03.2020
b) of which purchased by exception from GEO no. 11/2020

Table 2

No	Product	Initial stock	ordered	Reception	Distributed	Final stock
1	Surgical mask	20,000.00	105,000.00		-	20,000.00
2	FFP2 mask	-	-		-	-
3	FFP3 mask	168.00	-		-	168.00
4	Surgical gloves	17,730.00	26,000.00		-	17,730.00
5	Protective overalls	663.00	500.00		-	663.00
6	Biocides TP1 (personal)	1,771.00	240.00		-	1,771.00
7	Biocides TP 2 (surfaces)	6,315.50	5,637.00		-	6,315.50

24.03.2020

Table 3

Situation on 30.03.2020				
Product name	UM	45 days re-quired	Stock	% coverage required
Protective overalls	pcs	10,000	692.00	7%
Sort UF	pcs	10,000	-	0%
UF underwear	pcs	27,000	-	0%
Individual medium protection equipment for staff (STERILE GOWNS)	pcs	82,000	11,232.00	14%
Individual medium protection equipment for staff (visitor GOWNS)	pcs			
Individual medium protection equipment for staff (non-sterile impermeable GOWNS)	pcs			
Short gloves (pcs) (surgical + examination)	pcs	1,340,000.00	799,622.00	60%
Surgical gloves	pairs	20,000.0	32,422.00	162%
Examination gloves	pcs	1,320,000	767,200.00	58%
Protective glasses	pcs	4,500	492.00	11%
Protective visor	pcs	10,000	-	0%
FFP2 medical masks	pcs	10,000	200.00	2%
FFP3 medical masks	pcs	10,000	242.00	2%
Surgical mask	pcs	200,000	20,750.00	10%
Rubber boots	pcs	1,000	-	0%
Disinfectant TP1 for the hygienic disinfection of hands by rubbing	l	2,000	164.00	8%
Disinfectant TP1 for the hygienic disinfection of hands by washing	l	4,430	1,797.00	41%
Disinfectant TP2 for high level disinfection for critical surfaces	l	2,000	687.00	34%
Disinfectant TP2 ultra-fast, ready-made for critical medical surfaces and devices	l	4,000	858.00	21%
Disinfectant for semi-critical surfaces	l	4,000	1,797.00	45%
Disinfectant for non-critical surfaces	l	1,000	-	0%
Aeromicroflora disinfectant set	l	2,500	795.00	32%
instruments	l	1,960	2,251.00	115%
Chlorigen	pcs	192,000	18,600.00	10%

Table 4

Clinic/compartment/laboratory							
SHEET REGARDING THE RECEIPT AND USE OF THE PROTECTIVE PRODUCT - SURGICAL MASK							
No	Name and surname of the user	Date	Hour	Salon / location of use or no. of FOB	pcs	Work	Signature
1							
2							
3							
4							
5							

Given the global shortage of personal protective equipment, the following strategies can facilitate the optimal use of PPE (Fig. 1). Ensuring that personal protective equipment (PPE) is used rationally and correctly Personal protective equipment should be used based on the risk of exposure (e.g. type of activity) and transmission dynamics of the pathogen (e.g. contact, droplets or aerosols). Excessive use of PPE will further impact supply difficulties. By considering the following recommendations, the rational use of PPE can be ensured: – The type of PPE used when providing care to patients with COVID-19 will vary depending on the situation, the health personnel and the activity performed (table 1). – Medical personnel involved in the direct care of patients must use the following PPE: gowns, gloves, mask and eye protection (goggles or face shield). – Specifically, for aerosol-generating procedures for patients with COVID-19 (eg, intubation, non-invasive ventilation, tracheostomy, cardiopulmonary resuscitation, manual ventilation before intubation, bronchoscopy, gastroscopy, and collection of PCR COVID tests) medical personnel must to use protection, gloves, gowns, FFP2 and FFP3 masks; waterproof aprons will also be used, if the coveralls/gowns are not waterproof.”

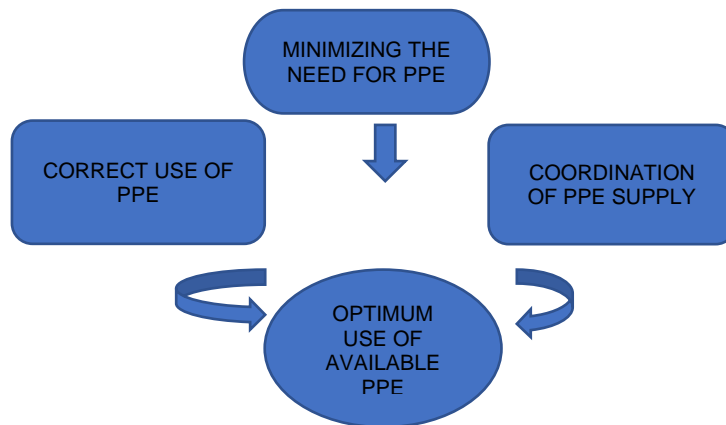


Fig. 1. Strategies for optimizing the availability of personal protective equipment (PPE)¹

Thus using the information from the requested reports as well as from Order 533/2020, depending on the specifics of the health units, the Nomenclature of the emergency stocks of each unit should contain at least the existing products in tables 1, 2, and 3.

Conclusions

Through this work, a part of the reality experienced in public health units was made known, and under this aspect, it was desired to generate recommendations for improving good practices. The objective of making necessary emergency stocks in a pandemic context and implementing good practices - unitary procedures, in the public sanitary units in Romania, is a necessary and real one, in order to improve the efficiency and performance of the procurement, supply processes, as well as and efficient use of public funds. The less pleasant experiences, it is necessary to use them to build a better future. Therefore, we can use as reference products in the creation of emergency stocks, the products used during this period of the pandemic, mentioned in all reports, with minimum compliance with the indications for use in Order 533/2022.

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¹ Figure 1 is reproduced in facsimile.

THE REORGANIZATION OF THE EDUCATION PLANS OF MEDICAL UNIVERSITIES, IN THE POST-PANDEMIC CONTEXT, BASIS FOR THE EFFICIENT USE OF PUBLIC FUNDS

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Abstract

Purpose – *The purpose of this paper is to demonstrate the need for a unified approach at the university level regarding the introduction of courses on medical devices and protective equipment into the educational programs, in order to contribute to the future development of the field.*

Methodology/approach - *The research methods that will be used are the case study.*

Findings – *The importance of this paper can be justified at least by the following arguments: contributes to the development of the stage of knowledge of the theoretical training in the field of medical devices and protective equipment, having direct implications on the performance management of universities, health units and medical staff;*

Research limitations/implications – *Lack of description of the disciplines, within the medical universities.*

Practical implications – *Theoretically, through this paper we want to emphasize that, in the current academic, economic and financial context, in the processes of planning, purchasing and conducting medical acts, decisions on the characteristics of the products used must be made on the basis of theoretical knowledge.*

Originality/value – *We can say that this work is both valuable and original because the claims are not just theoretical. The main author of this paper is not only a theoretician, but a man who worked in the health system during the pandemic and before it, and studied Health Management at UMFST Targu Mures.*

Key words: *medical education, medical devices, PPE*

Introduction

The motivation for choosing this topic was the desire to identify ways to streamline the training process at the level of medical universities, and then in continuing medical training, in the field of medical devices and protective equipment, which faced a number of deficiencies in establishing their minimum characteristics in the pandemic context. These problems were caused by the lack of curricula in medical curricula to study medical devices and equipment, as well as protective equipment. At the same time, within the public procurement procedures, the specialists who draft the specifications that describe the minimum technical characteristics that the products must meet for the proper development of the medical act, are doctors and nurses. Without training in the field of medical devices, protective equipment, in public procurement, they must describe in detail for each product, technical characteristics and minimum standards that the products must meet. It is particularly important for them to know the notions, legislation, and standards of medical devices, not only in terms of efficient use of public funds, by conducting the public procurement process, but also to conduct their medical activity safely for himself, the patient and the medical staff.

The context of the work

"Educational management is the science and art of preparing human resources, to form personalities according to purposes requested by society and accepted by the individual. It presupposes an interdisciplinary approach, which studies the events that intervene in the decision to organize a determined pedagogical activity and in the management of educational programs. Management also involves emphasis on ideas, on a systematic approach, on change, on strategy on innovation." (Nicolae Stan).

With this paper we want to study the existence or non-existence in the curricula of medical universities of courses on the notions, legislation and standards of medical devices and protective equipment. To show the importance of knowing these notions in order to carry out the medical act and the efficiency of the use of public funds.

From an applied perspective, the results obtained from this paper have the role of providing a clear answer to the questions related to the need for a unitary approach at university level on the introduction in the curricula of courses on medical devices and protective equipment.

Also, the topic addressed in this paper is a potential future contribution to the development of the field.

The motivation and importance of this work comes precisely from the perspective of the less happy experiences lived practically in the public health units in Romania, in the context of the two years since the beginning of the COVID 19 crisis, when the medical staff hit the ignorance of these notions of ambiguous, incomplete, overestimated or even contradictory technical characteristics tasks, things that even led to the delay in the completion of tenders.

The subject is motivated, first of all, by the fact that a minimal but thorough training of medical staff in Romania, and in the field of medical devices and protective equipment is absolutely necessary for the medical act, but must be placed in this pandemic context and post-pandemic, and economically present, for the efficient use of public funds, technically and financially, secondly.

Methodology

The research method that will be used is: the case study. R. K. Yin considers that the case study defines "a strategy for conducting research that requires empirical investigations into a particular contemporary phenomenon, in a real life context and using multiple sources of information (interviews, questionnaires, testimonies, evidence, documents)". The main purpose of this study is to show that in the absence of a minimum but thorough training of medical staff in Romania, and in the field of medical devices and protective equipment is absolutely necessary for the performance of the medical act. Therefore, this research paper requires a well-founded theory. In addition, the use of this research method results in evidence and quality facts.

The objectives of the paper

To this end, this paper has the following specific objectives:

1. Conducting an analysis of the existence or non-existence in the study programs of medical universities of courses on the notions, legislation and standards of medical devices and protective equipment.
2. Carrying out an analysis regarding the persons who draw up the description of the specifications in the public health units.

General aspects and theoretical foundations

To keep people healthy and active for longer, for example by providing solutions for disease prevention or early diagnosis, to reduce length of hospital stay, complications, faster recovery, thereby saving time and financial resources of patients, service providers healthcare and the social health insurance system, and to make healthcare systems more efficient, it is necessary to purchase safe, effective and innovative medical devices and technologies by health facilities.

In the procurement and supply processes of medical devices and PPE, the lack of knowledge in this field generates non-compliant practices. They lead to the supply of substandard medical devices and technologies, which cannot be traced. Also, there is the risk of purchasing counterfeit products that do not comply with the legal provisions in force.

There is both European and national legislation transposing European legislation on medical devices and PPE. What is a medical device? In accordance with Regulation (EU) 2017/745 of the European Parliament and of the Council of 5 April 2017 on medical devices, ("Regulation No. 745/2017") a "medical device" is defined as any instrument, apparatus, machine, computer program, implant, reagent, or other article, intended by the manufacturer to be used, separately or in combination, by human beings for one or more of the following medical purposes: diagnosis, prevention, monitoring, prediction, prognostication, treatment, or amelioration of a disease; diagnosis, monitoring, treatment, amelioration or compensation of an injury or disability; investigation, replacement or modification of an anatomical structure or a physiological or pathological process or condition; providing information through in vitro examination of samples taken from the human body, including organ, blood and tissue donations; and which does not perform its intended primary action by pharmacological, immunological or metabolic means in or on the human body, but which can be assisted in the performance of its function by such means.

The following products are also considered to be medical devices: devices used for the purpose of controlling or promoting conception; products specifically intended for cleaning, disinfecting or sterilizing the devices referred to in Article 1 paragraph (4) of Regulation no. 745/2017, as well as those mentioned in the first paragraph from this point.

Therefore, any material used by doctors, assistants, medical university students, for diagnosis, monitoring, treatment is a medical device. Practical work for this category of person involves the use of medical devices. In order to purchase and supply sanitary units with medical devices and PPE according to the needs of diagnosis, monitoring and treatment, a correct description of them is necessary. This description sets the minimum acceptable standard, to be unambiguous, transparent and not aligned to a particular firm or group of enterprises. The purpose of the specifications is to provide potential suppliers with a clear, accurate and complete description of the needs of health facilities and to meet the needs.

Although the use of the standards is voluntary, with the onset of the pandemic, depending on the level of protection that these products had to meet, they nevertheless became mandatory when they were included as requirements in the award documents. The role of standards in technical specifications was to increase the common understanding of procurement documents between buyers and suppliers.

What is the standard? This is a document, established by consensus and approved by a recognized body, which provides, for common and repeated use, rules, guidelines or characteristics for activities or their results, in order to achieve an optimal degree of order in a given context. Standards can be national, European, international, harmonized. They are identified by the existence of the initials SR, SR EN, SR EN ISO, at the beginning of the standard code.

Therefore, in the Terms of Reference, in relation to the concrete need of the purchase, there must be at least the following: the explanation of any technical or specialized terms, the purpose/how to use the equipment or the product purchased, references to any applicable documents (such as standards or legislation) , material requirements, tolerances or variability, requirements for appearance, texture, finish, conditions of installation, use, production or storage, tolerances for reliability, quality, size, hardness and other key characteristics, measures of quality and performance , test reports, information on labeling in Romanian (name, lot, importer, manufacturer, notified body, lot, validity, sterile, non-sterile, storage conditions) and the application of the CE mark.

Educational management refers to the theory and practice of general management, applied to the education system and process. In this view, education is a kind of company run by one or more managers. However, given the aims of the education system, the complexity of the educational process, the variety and extent of the resources involved and the specificity of the final product which is not a concrete and tangible one, educational management has a particularly pronounced specificity, highlighted, mainly, by what theorists call the human component of process. As a consequence, educational management must be more art than science, because it is not only a service offered to

people (as external subjects of the process), but penetrates into their inner being, causing a change in their psycho-intellectual.

Educational management is "the science and art of preparing human resources, of forming personalities, according to goals accepted by the individual and by society or a certain collective. It includes a set of principles and functions, rules and management methods that ensure the achievement of the objectives of the educational system (as a whole or at the level of the component elements), at the highest standards of quality and efficiency." (John Jinga).

The signatories of the descriptions in the specifications in relation to their training according to the education plans of the medical universities

Who identifies and describes the need for medical devices and protective equipment in public health facilities? After studying the tenders organized by the public health units, from the www.e-licitatie.ro platform, but from the person who works in this field, I concluded that in all cases, they are carried out by specialists. Physicians and assistants users of medical devices and PPE. Going further with the analysis, we studied the complaint files submitted to the National Council for the Resolution of Appeals, by the suppliers, and concluded that the basis of the appeals is the improper description of the products, which do not comply with the minimum requirements presented in the previous chapter. These appeals, as well as the bid evaluation part, greatly delay the procurement process, which can lead to stockouts.

With the onset of the pandemic, the list of protective devices and equipment needed to combat the SARS COV2 virus in health facilities has grown considerably. Products of different protection levels had to be used, according to national, European, international or harmonized standards, which had not been used before. Specialists, doctors and assistants were put in a position to define the need and describe it, for the procurement process. In a regional emergency hospital, doctors and nurses did not have the ability to distinguish medical devices from PPE. They did not know the standards these products had to meet for different levels of protection. They copied the description of some products from other colleagues in the country, requested certain standards, but when evaluating the offers, even those who requested the presence of the standards, did not know what they provided and how they could check if, according to the test reports, these standards were met. There were situations where they chose only the comfort provided by the product, without checking whether the product complies with the level of protection, according to the standards. All these situations led or could lead to the exposure of doctors, nurses and patients to the real danger of infection within health facilities.

Taking into account the previously described, from the desire to identify a possible cause of the lack of knowledge regarding medical devices and PPE, we studied the Education Plans, of the medical universities in Romania (table 1 and 2), to analyze the mandatory subjects, optional and optional from their content. I found that only one university, the "Carol Davila" University of Medicine and Pharmacy from Bucharest, has for its study program general medicine, as an optional discipline for the sixth year, Medical devices.

Therefore, the specialists who should identify needs and describe them, do not have the minimum knowledge of the legislation, regarding medical devices, and on the occasion of the PPE pandemic, which they use in their daily activity, in diagnosis and treatment. This gap existed even before the pandemic period, but it was autized with the onset of the pandemic, creating a real danger.

Conclusions

The importance of this work is justified at least by the following arguments:

- contributes to the development of the stage of knowledge of the theoretical training in the field of medical devices and protective equipment, having direct implications on the performance management of universities, health units and medical staff;
- contributes to the knowledge of the need to study the field of medical devices and protective equipment, of major importance in the management of pandemic situations, and not only;
- highlights the fact that, in the current pandemic, economic and financial context, in the educational, supply and medical process, the correct planning, budgeting and forecasting processes have a special importance, meant to diminish the limits of the decision-making process and performance;

Table 1

Education plan 2021-2027

No	University name	STUDY PROGRAM	The existence of mandatory discipline	The existence of the discipline as optional
1	University of the West Vasile Goldis Arad	GENERAL MEDICINE	no	no
2	Transylvania University of Braşov	GENERAL MEDICINE	no	no
3	Ovidius University of Constanta	GENERAL MEDICINE	no	no
4	University of Medicine and Pharmacy "Grigore T. Popa" Iasi	GENERAL MEDICINE	no	no
5	UNIVERSITY OF MEDICINE AND PHARMACY,,IULIU HATIEGANU,, CLUJ - NAPOCA	GENERAL MEDICINE	no	no
6	Oradea University	GENERAL MEDICINE	no	no
7	"George Emil Palade" University of Medicine, Pharmacy, Sciences and Technology from TÂRGU MURES	GENERAL MEDICINE	no	no
8	"CAROL DAVILA" UNIVERSITY OF MEDICINE AND PHARMACY FROM BUCHAREST	GENERAL MEDICINE	no	yes
9	Craiova University of Medicine and Pharmacy	GENERAL MEDICINE	no	no
10	UNIVERSITY OF MEDICINE AND PHARMACY "VICTOR BABEŞ" TIMISOARA	GENERAL MEDICINE	no	no
11	Lucian Blaga University from Sibiu	GENERAL MEDICINE	no	no

Table 2

Education plan 2021-2027

No	University name	STUDY PROGRAM	The existence of mandatory discipline	The existence of the discipline as optional
1	UNIVERSITY OF MEDICINE AND PHARMACY,,IULIU HATIEGANU,, CLUJ - NAPOCA	GENERAL MEDICAL CARE	NO	NO
2	University of the West Vasile Goldis Arad	GENERAL MEDICAL CARE	NO	NO
3	University of Medicine and Pharmacy "Grigore T. Popa" Iasi	GENERAL MEDICAL CARE	NO	NO
4	Oradea University	GENERAL MEDICAL CARE	NO	NO
5	Ovidius University of Constanta	GENERAL MEDICAL CARE	NO	NO
6	Craiova University of Medicine and Pharmacy	GENERAL MEDICAL CARE	NO	NO
7	"George Emil Palade" University of Medicine, Pharmacy, Sciences and Technology from TÂRGU MURES	GENERAL MEDICAL CARE	NO	NO
8	UNIVERSITY OF MEDICINE AND PHARMACY "VICTOR BABEŞ" TIMISOARA	GENERAL MEDICAL CARE	NO	NO
9	Lucian Blaga University from Sibiu	GENERAL MEDICAL CARE	NO	NO

- emphasizes that, in the current academic, economic and financial context, in the processes of planning, purchasing and conducting medical acts, decisions on the characteristics of the products used must be made on the basis of theoretical knowledge.

As a result of the difficulties encountered during the pandemic period, the study of the Education Plans, the study of the descriptions in the tenders and the appeals to the tenders, a good practice in the future, as educational, health and financial management, is to analyze the possibility of introducing into the Education Plans, as subjects compulsory study of medical devices and PPE, within the training programs of general medicine and general medical assistance. The real situations experienced in this pandemic should be a lesson in order to solve the identified shortcomings.

An incorrect description of the necessary products, due to a lack of basic training, leads to the purchase of products that do not meet the needs of medical units, which also implies an inefficient use of public funds.

At the same time, the training and updating of knowledge in this field of doctors, nurses and decision-makers in health facilities should not only be carried out at the level of bachelor's and/or master's degrees, but should also be carried out through the College of Doctors and the Order of Medical Assistants.

Through this work, the reality of the curriculum at the level of medical universities was demonstrated in this aspect, the impact on the medical act and it generated recommendations for improving good practices.

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MAIN NON-CONFORMITIES FOUND BY THE ASSESSMENT THE HABILITATION OF PRE AND POST COVID-19 HOSPITALS

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Abstract

Purpose - To identify the main pre and post COVID-19 non-conformities in ensuring and continuously improving the quality of health services and patient safety following the evaluation of hospitals through standardization.

Methodology/approach - For this exploratory study we used the policy and regulatory framework for quality assurance of bed-based health facilities, as well as publicly and directly available data from the National Health Quality Management Authority, research tools evaluation and monitoring checklists for a category of quality indicators, mainly targeting direct observation checklist indicators, efficiency and effectiveness indicators, monitoring indicators and critical indicators, the latter allowing the evaluation committee to interrupt the visit when identified. We analysed the available data and information focusing on the whole system. We surveyed 285 accredited health units out of a total of 675 health units registered in the accreditation process and 94 health units monitored in the thematic monitoring process, for the direct monitoring visit and the majority of health units through self-assessment.

Findings - Non-compliant indicators from the assessment process were predominantly indicators that are prevalent on the direct observation lists. I mention here indicators related to: age of buildings, inadequate infrastructure, retrogressions, facilities for people with disabilities, circuits and transport. In general, structural changes require large investments, so changes in mentality and improved information circuits between different services and units, through information sharing and group work apprenticeships, are essential.

Research limitations/implications - The research does not cover all hospitals under evaluation in the second accreditation cycle, as this cycle runs until 2023. During the state of emergency, evaluation and monitoring visits were stopped and monitoring tools were not used. Monitoring includes surveys during the state of alert. Self-assessment was carried out for most health facilities, but monitoring through monitoring visits was carried out only in 94 health facilities.

Practical implications - Monitoring led to the use of procedures, protocols for limiting the increase in O₂ concentration. The questionnaires used were those from the thematic monitoring of the National Health Quality Management Authority. Data analysis reiterated the need to implement quality management not only at the declarative level but also at the system level. The data used were data from the National Authority for Quality Management in Health.

Originality/value - To the best of our knowledge, there is no integrated management system at the level of health facilities, there is no methodology available to decrease the failure rate of continuous improvement projects, providing a "roadmap", a clear traceability for the use of quality management systems approach. The analysis and study on pre and post CoVID-19 accreditation and monitoring in Romanian hospitals has not been carried out.

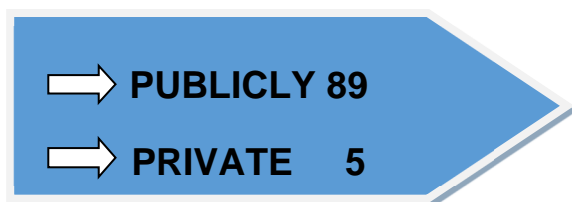
Key words: quality, accreditation of health facilities, monitoring, pandemic, quality culture, monitoring indicators.

Introduction

Patient safety has been a worrying issue in the Romanian healthcare system in recent years, reflecting international trends. Updating the regulations and procedures for the assessment, accreditation and monitoring of healthcare, hospital and ambulatory care providers in Romania aims to promote patient safety and quality healthcare services. One component that has received special attention recently is the monitoring of healthcare facilities. Accreditation of health care units is the process of validating the conformity of the characteristics of health care services performed by health care units with the accreditation standards adopted by National Authority for Quality Management in Health Care and approved under the terms of this law, as a result of which health care units are classified into accreditation categories to confer confidence in their technical-professional and organizational competence [1]. Health facility assessment is the activity of analysing the level of compliance of health facilities with accreditation standards, carried out by external health service assessors, independent of stakeholders, when health facilities request to enter the accreditation procedure. [1] National Authority for Quality Management in Health Care accreditation is a cyclical process that takes place every 5 years, the current accreditation cycle, the second, will end in 2023. During the 5 years of validity of the accreditation certificate, the monitoring process of the accredited units takes place, with the aim of supporting these units in maintaining the conditions on the basis of which they have obtained the accreditation, but also in implementing new solutions that contribute to the continuous improvement of the quality of health services and patient safety.

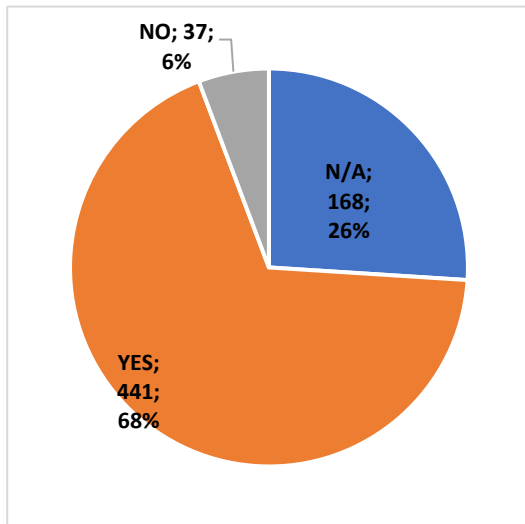
Thematic monitoring can be an alternative to evaluation, to continuous improvement of medical activity, and to the implementation of accreditation standards. It is an essential pre- and post-accreditation process that aims to ensure that hospitals are continually concerned with maintaining and improving the quality of service provided and patient safety. It has a proactive, and supportive role. The study shows how hospitals had to adapt to an unprecedented situation **SARS-CoV-2 pandemic** in a very short time. Structures and services were reorganised, human resources were adapted, the necessary equipment was provided, new procedures were developed and implemented, and new facilities were developed. All hospitals were sent detailed explanations of the monitoring topics for which self-assessment of related risks was required: patient admission, workplace safety and security, equipment and facility safety. From the totality of hospitals only 7 hospitals did not communicate the data set, to which ART. 3 of ANMCS ordinance no. 433/2020 was applied. A minimum of 2 hospitals, which were randomly selected, both public and private, COVID wards and non-COVID wards, from each county, were subject to research in the thematic monitoring phase I in February 2021 according to the thematic monitoring visits for field validation of data. 89 public hospitals and 5 private hospitals, divided by category (Table 1). These topics covered many current aspects of running a bed-based health facility. For example: reporting adverse events associated with healthcare, waste management, etc., but also issues arising from one-off circumstances, preparing units for the reception of patients with COVID-19 or suspects, assessing units after adverse events, how bedded health units are prepared to respond to disasters.

Table 1. Hospitals that received the February 2021 thematic monitoring visit

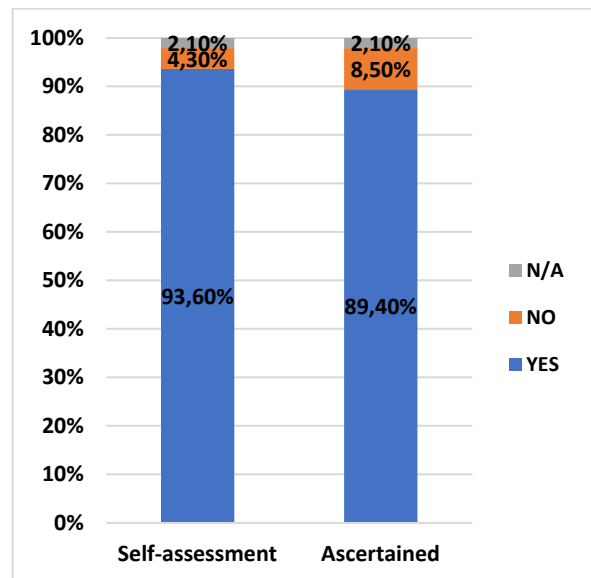


a) Category I - very high level of competence:	6
<i>aa) category I</i>	3
<i>ab) category I M</i>	3
b) Category II - high level of competence:	19
<i>ba) category II</i>	10
<i>bb) category II M</i>	9
c) Category III - medium level of competence:	32
d) Category IV - basic competence level:	32
e) Category V - limited level of competence:	5

Data on the use of O₂ facilities, (Fig 2), employee route and patient route, occupational burnout syndrome, pandemic communication adaptation, and fire safety and security were analyzed. From the analysis, we found that the health care facilities conducted staff training on the prohibition of the use of flammable materials in rooms where patients with continuous O₂ therapy are admitted and the handling of incompatible substances to react exothermally with O₂ at concentration above the alarm threshold in 56.4% (Fig. 3). Although O₂ itself is non-flammable, it promotes combustion and allows all flammable materials to burn much more vigorously; the risk is all the greater because O₂ is odourless and can only be detected by specific sensors. Therefore, the lack of continuous monitoring of the O₂ concentration in the air in medical premises may favour its increase above a certain value (22.5 - 23%) and represents a major risk in the occurrence of fires even from a simple spark. The risk can be reduced by better ventilation.



Status of the indicator from the perspective of self-assessment by 646 USP



Situation of the indicator in 94 self-assessed sanitary units and subsequently, the finding in the field

Fig. 2. The locations where the O₂ concentration must be monitored are identified



Status of the indicator from the perspective of self-assessment by 646 USP

The status of the indicator from the perspective of self-assessment and, subsequently, the finding in the field of 94 USP

Fig. 3. Health Units that have carried out staff training on the prohibition of the use in rooms where patients are hospitalized with continuous O₂ therapy of flammable materials and the handling of incompatible substances to react exothermally with O₂ at a concentration above the alarm threshold

The International Joint Recommendations on Medical Electrical Safety specify that, at ambient pressure, the O₂ concentration in the air in medical premises should not exceed a certain value, and the warning and avoidance of such a dangerous situation is done by continuous monitoring by O₂ sensors. Declared by self-assessment on the specific National Authority for Quality Management in Health Care platform, 68.3% of the monitored health units (441 out of 646) confirm the identification of premises requiring O₂ concentration monitoring, while 5.7%, 37 out of 646 did not identify these premises, and for 26% 168 out of 646 health units the indicator does not apply the medical services offered in these units do not require O₂ installation. Staff training contributes, together with O₂ concentration monitoring, to reducing the risk of fire corresponding to O₂ concentration above the safe limit in the premises where it is used. Staff should also be aware of the frequency with which they should ventilate the premises if there is no automatic air ventilation system. For the employee route and the patient route, we found differences between the statements made by the health facilities and the findings made during the monitoring visits (Fig. 4) and (Fig. 5). Triage contributes to reducing the infectious risk as a result of highlighting the possibility of germ carriage from staff to patient or staff to staff. Prompt confirmation of the suspected case is necessary to ensure rapid and effective epidemiological surveillance of contacts, implementation of infection prevention and control measures and collection of epidemiological and clinical information. If a patient or staff member presents with specific signs and symptoms according to the case definition, it is recommended to apply infection-specific measures. Separation of pathways without intersecting at any point together with epidemiological triage of staff contributes substantially to reducing the infectious risk to the patient. At the time of the online self-assessment, 81.9%, 528 out of the total of 646 health facilities reported having separate circuits for suspected COVID-19 patients. As a result of the monitoring visits, the percentage of these units decreased to 58.5%, 55 out of 94 health units visited, with the causes of invalidation including: crossing of circuits mostly at elevator level, deletion of markings or non-compliance.

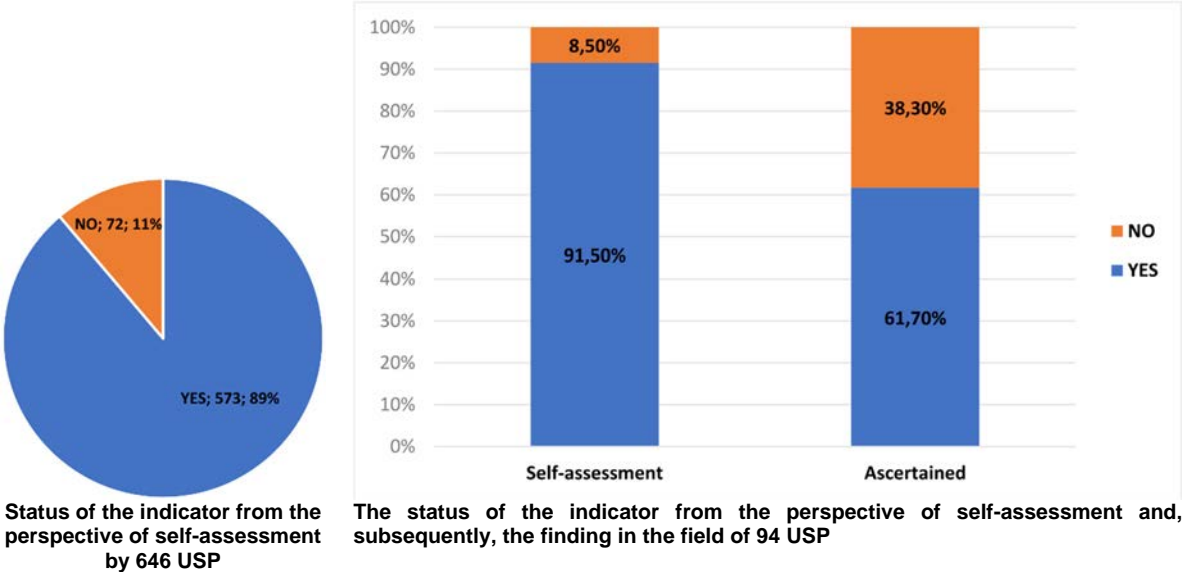


Fig. 4. Staff access ways are separate from patient access

The analysis of the monitoring of burnout syndrome presents the status of the indicator from the perspective of self-assessment by 646 health facilities. The health units defined alarm indicators related to the occurrence of burnout syndrome, reveals according to (Fig. 6) the existence of a difference between the self-assessed 646 health units and the health units where the indicator was found 94 health units. The screening - diagnosis - solutions professional exhaustion is a recent concern in the Romanian healthcare system, although the signs of this phenomenon appeared before the COVID-19 pandemic, and became more pronounced during its duration. Most of the time, the concern for this phenomenon has been limited and sometimes confused with the evaluation of employee satisfaction.

The study on the indicator: the health facility has a fire safety permit for all buildings reveals that (Fig. 7) for the sub-theme: safety and security in case of fire of the total number of assessed health facilities 57.3% had a negative response to the self-assessment, compared to 73.4% found for the 94 health facilities where monitoring visits were made. Safety and security in case of fire, the indicator analysed "the sectors of activity of the health unit are organised in such a way as to allow evacuation in case of

emergency by at least two routes" was found according to (Fig. 8) that 57.4% of the health units allow evacuation by two routes. The existence and knowledge of the staff of at least two escape routes is verified, the lift not being considered as an escape route, which is also properly signposted 24/7. Declaratively, 85% of health facilities (549/646) confirm that they are properly organised for the situation.

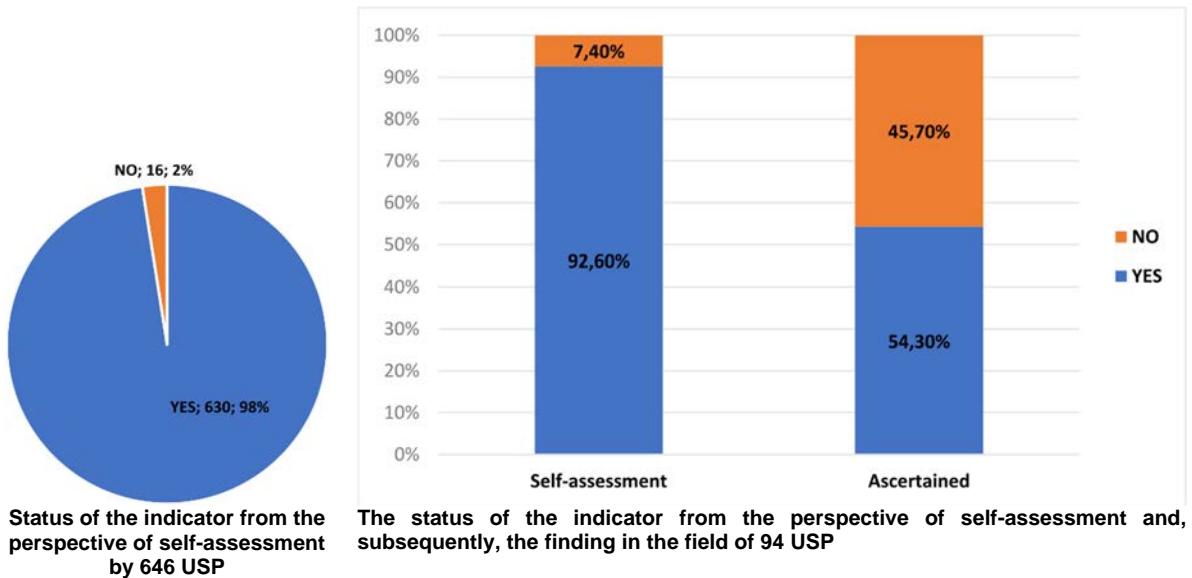


Fig. 5. Access ways for staff are provided with triage points.

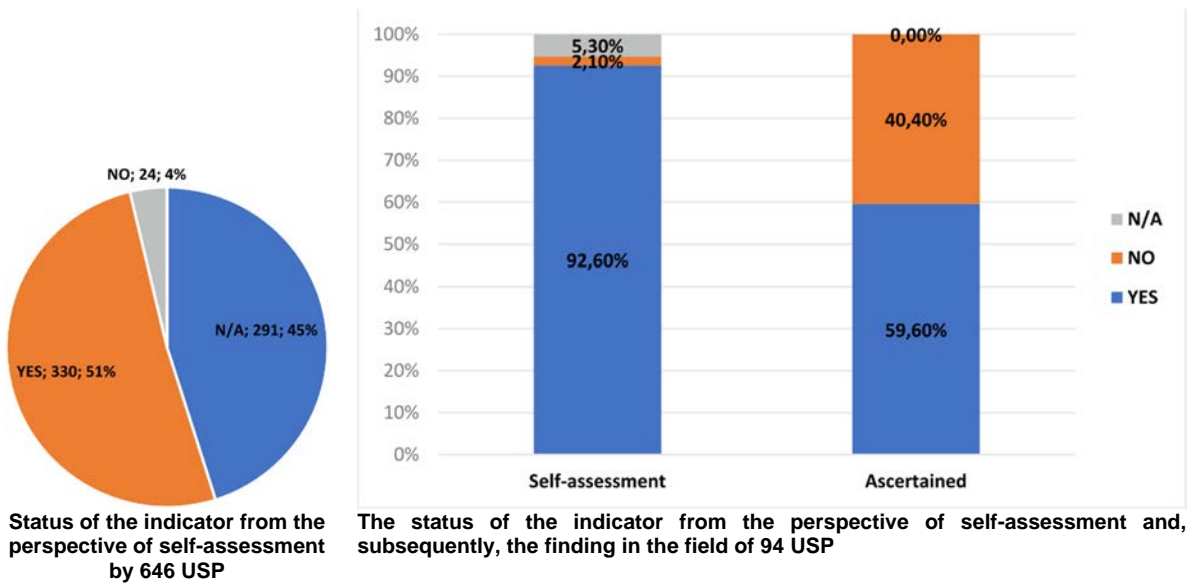


Fig. 5.1. There are separate circuits for patients declared suspicious after triage

The percentage of self-reporting is reconfirmed among the hospitals monitored in the field, 85.1%, respectively 80/94 health units and found in 57.4% health units (54/94); the difference is justified by the fact that not all sectors of activity have this facility related to evacuation. The existence of an alternative source of O₂ decreases the risk of complications and even death in patients dependent on oxygen therapy. 62.9% of all hospitals (406/646 health facilities) reported the existence of alternative solutions for oxygen therapy. Visits to 94 hospitals showed that such solutions exist in 71 of them (75.5%). Exceeding the rated capacity is a major risk that can lead to automatic power cut-off, fuses tripped on overload or a fire. The use of extension cords or other temporary devices carries the risk of overloading the power grid and blocking access routes, or preventing staff and patients from moving around. A fire in a hospital can start from a variety of causes, with a much greater risk in areas where O₂ is

administered for therapeutic purposes; the source of a fire can be a short circuit or a faulty connection to a mobile phone, radio, air heater.

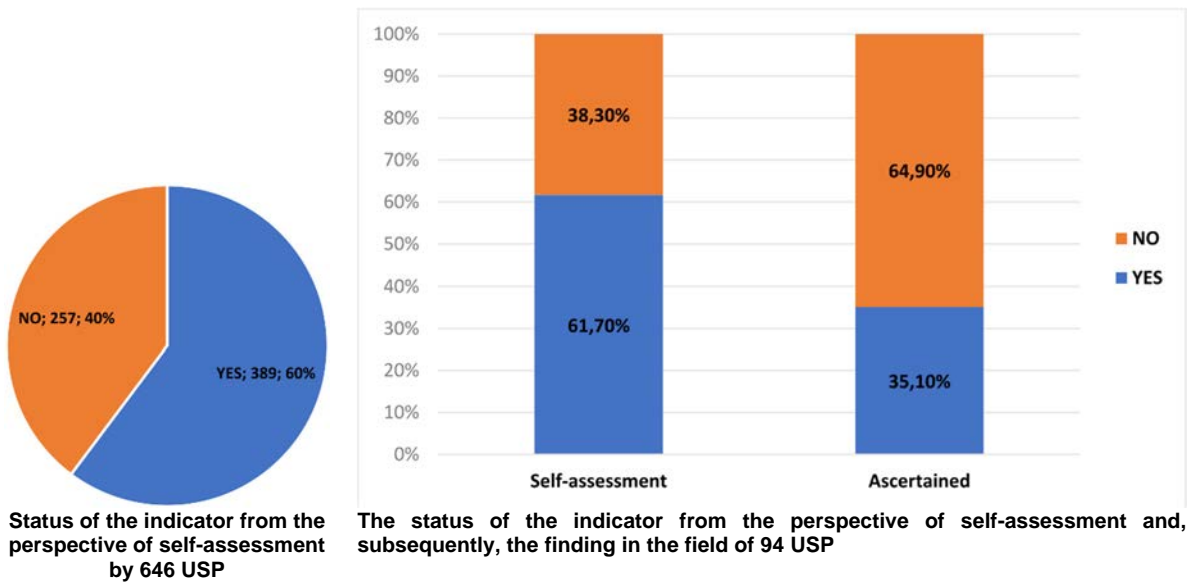


Fig. 6. Syndr monitoring. of "professional exhaustion" ("burn-out") The health unit has defined alarm indicators related to the installation of the exhaustion syndrome.

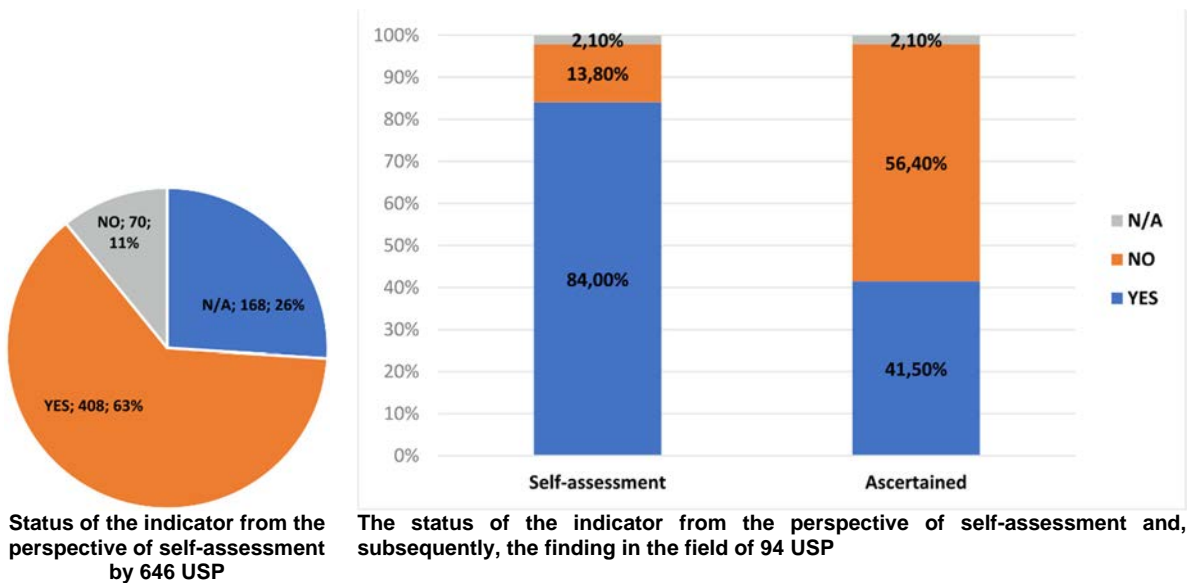


Fig. 7. The sanitary facility has a fire safety permit for all buildings

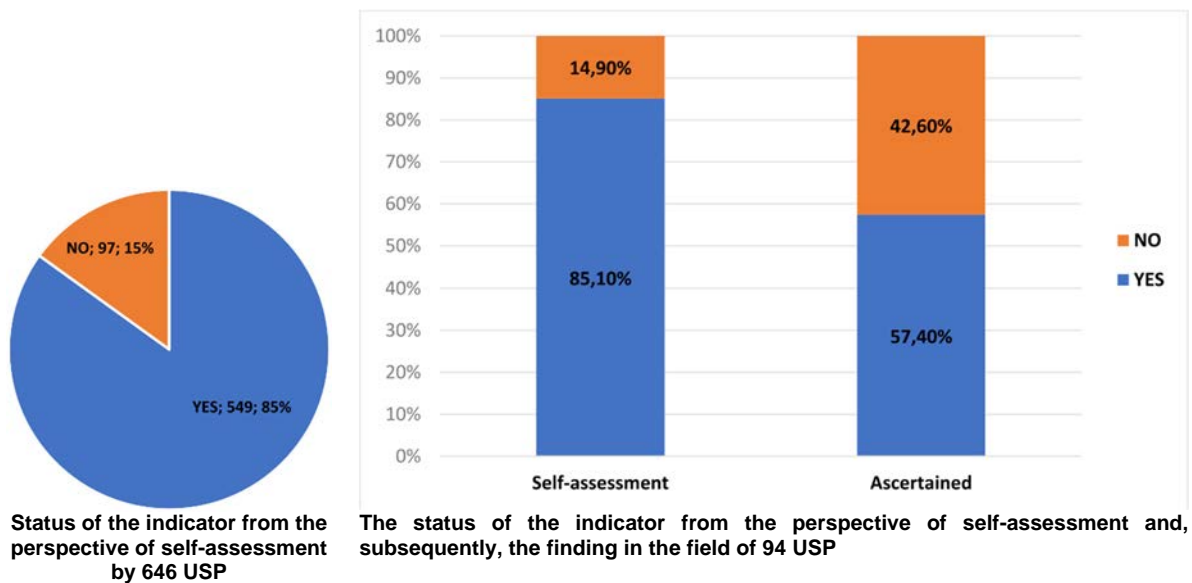


Fig. 8. The activity sectors of the health unit are organized in such a way that they allow emergency evacuation by at least two routes

Discussion and conclusions

The monitoring of the health units in Romania showed real progress during the period under review, supported by improvements in the policy and regulatory framework, their adaptation from the start and learning from mistakes. We found an increasing number of patients requiring high flow oxygen. Wards that were not designed for such therapy, lacking room ventilation facilities of min. 6 volumes/hour, are having to take on such patients. It is necessary that the hospital management is permanently connected with the situation of these wards, in order to be able to apply risk mitigation measures, continuous monitoring of O₂ concentration in the air, specific trainings for staff. The existence of back-up solutions requires the involvement of the guardian authority, respectively the **Ministry of Health**, the Local Council, the County Council, in order to ensure the continuity of O₂ supply to patients in case of failure, to eliminate the risk of continuing to use a plant when failures occur: the plant can thus be shut down, repaired and then restarted and to eliminate the risks of "improvisation" to repair failures in a plant that could not be shut down. The value added by monitoring analysis is:

- awareness of all stakeholders on various key issues;
- opportunity to identify, with professionalism and honesty, other problems;
- not a process to tick off, but to trigger corrections, identify causes and improve;
- a cooperative process between Health Units and the National Authority for Quality Management in Health;
- shows us "Where are we? and What more to do?".

The Socratic tradition of our medicine is based on medical competence and skill and techniques acquired in the field, in contact with other professionals belonging to the same body. Interdisciplinary encounters should lead to treating the patient as a system not as a disease in which clinical governance predominates. Instruction and information can no longer be kept or spread stingily by some who assume power over the exclusivity of their science. When it is written down, teaching is easy to transmit.

The **SARS-CoV-2 pandemic** has tested the resilience of the healthcare system and beyond to an unprecedented situation. Healthcare facilities have had very little time to prepare, to reorganise their services, to train staff, to develop effective ways to motivate employees and care for patients safely. The response to this situation has brought unprecedented transformations, implemented by most hospitals in a relatively short time. During this period, the equipping of health units with specific and much-needed equipment has taken place at a rapid pace and, above all, in line with the immediate needs identified. New working procedures have also been adopted in hospitals in a short time and interest in telemedicine services has increased.

Despite the progress made by health facilities on several fronts, the following issues remain uncovered:

- (i) burnout with the highest rate of negative responses,
- (ii) separation of patient and staff circuits,
- (iii) fire preparedness, a red flag being the lack of fire safety authorisation and the reduced capacity to evacuate people from rooms,
- (iv) safe use of oxygen therapy,
- (v) inadequate conditions for the use of electrical installations with outdated installations with improvised extensions, combined with a lack of real-time control of their functionality.

A fire in a hospital can start from a variety of causes, with the risk being much higher in areas where O₂ is administered for therapeutic purposes. The source of the fire could be a short circuit, a faulty connection to a mobile phone, radio or air conditioner.

Remedial measures found from the study were used to develop their own checklists/monitoring tools. Reactive measures become proactive, through unannounced visits to hospitals where improvements were noted post National Authority for Quality Management in Health monitoring, but also other issues noted on an ad hoc basis: non-completion of cleaning charts, worn linen, lack of pillows or blankets, deficiencies in waste collection, bins without lids, staff wearing jewellery. Responsibilities that were concentrated in the hands of a few, today need to be disseminated in a controlled way. The implementation of procedures and protocols is quite difficult, the transition from oral to written culture faces existential but not impossible difficulties.

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Section 3

ASPECTS REGARDING THE IMPLEMENTATION OF MODERN MANAGEMENT METHODS AND ADVANCED TRAINING TECHNOLOGIES IN ORDER TO MAKE THE TRAINING OF ATHLETES MORE EFFICIENT

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Abstract

Purpose: *The aim of this study was to make sports management more efficient through the use of advanced technologies, including as a case study to investigate the relationship between accelerated growth, objectified by parameters: height, weight, BMI and cardiac endurance in junior athletes (10-14 years), members of sports clubs, practitioners of sports games (football).*

Methodology/approach: *The research methodology was based on the measurement of anthropometric and biochemical parameters of a group of 124 male athletes, 10 of which were valid in 34 athletes, as some were not measured in all 10 parameters, and other athletes had vitiated the result of the measurement, all 124 athletes being underage students, aged between 6 and 12 years. The variation of these parameters was studied with the help of mathematical methods that led to the objective identification of the physical potential by the sports technician, coach and even by the beneficiary or beneficiaries of the analysis (athlete or athletes), physical potential that can be minimum, maximum, constancy, or its trend: in progression or regression.*

Findings: *The results highlight, among other aspects, the presence of significant correlations between anthropometric parameters and cardiac resistance in junior athletes between the ages of 10 and 14. Acceleration of growth and development of children aged between 10-14 years, practicing sports games (soccer), may represent one of the causes of the decrease in cardiac resistance.*

Research limitations/implications: *Sport today has reached a high standard, so it is necessary to approach modern technologies, methods and objective models that will support the technicians and coaches in the world of sports. These models visualize the real potential of the athlete, the evolution of the individual's sports parameters, being able for the technician or coach to choose those exercises and trainings that develop the deficient elements, or to evaluate the performance or non-performance as such.*

Practical implications: *For a sports manager, he can make early decisions related to the potential of the subjects, if it is possible to increase cardiac endurance through education, physical culture and adequate and adapted training, or the subjects are possibly without sporting potential and thus everything comes down to a practicing sport for "pleasure", without speaking of performance.*

Originality/value: *It is generally accepted that a new approach is required, that the use of modern technologies is required in order to make sports management more efficient, to obtain real, objective results, and finally to increase sports performance.*

Key words: *Sports management, Sports performance, Sports potential, Anthropometric parameters, Modern technologies*

Introduction

It is generally accepted that a new approach is required, that the use of modern technologies is required in order to make sports management more efficient, to obtain real, objective results, and finally to increase sports performance. It is known that the COVID-19 Pandemic has affected the entire training and competition program of athletes. And from 2022, modern training technologies can once again be used to make the training of athletes more efficient, to increase the sports performance of the sports management, and to identify the real sports potential. The present paper proposes the structuring of this

scientific approach in five directions in order to streamline and maximize the modern methods of sports management, and in the present case study here only the first two directions of evaluation research will be used (the application of all 5 directions would lead to an exemption too size of the work). Specifically in this study we have: anthropometric evaluations and functional evaluations.

These parameters, height, weight, BMI and cardiac endurance among others, pencil in an indubitable way the possibilities and aptitudes of possible performance or possible non-performance of the subjects. Taking into account the diversity of sports specialties, the diversity of sports organizational entities as well as their functional types, this paper will focus on the basic constitutive element of the sports organization: namely the athlete, the athletes in order to make management methods more efficient. Depending on the types of sport practiced, we have group, intergroup and individual sports organizational entities. Group sports organizational entities existing in the case of team sports specialties: volleyball, handball, football, hockey, kayak canoe, etc., intergroup sports organizational entities being in the case of relay sports specialties, for example: athletics, swimming, gymnastics, etc., and the singular ones existing in the case of sports specialties such as: table tennis, field tennis.

Literature review. Equipment used for the study

- a. Anthropometric evaluations of the athlete, or the athletes constituting the organizational entities (has two sub-directions applied anthropometry: having as object anthropometric measurements: body lengths, diameter, perimeter, goniometry, dynamometry, body weight measurement, barometry - the center of gravity of the body, adipometry and qualitative anthropometry: segmental and body relations and proportions)
- b. Functional evaluations of the athlete, or the athletes constituting the organizational entities (directions of evaluation and research: applied physiology: evaluation of respiratory function, cardiac, muscular, vestibular function) [Blandine Calais, 2012]
- c. Motor evaluation (directions e evaluation and research: evaluation, monitoring and development of motor skills)
- d. Evaluation of human performance (research directions: evaluation, miniaturization and development of some factors of the performance capacity of athletes)
- e. Psychological and psychomotor evaluation (directions of research and evaluation: of the perceptive-cognitive-motor level in order to correct, perfect and develop new psycho-motor skills necessary for effective adaptation to an environment in continuous technological evolution, with a view to professional orientation) better orients the athlete in group entities: in football the athlete has better skills as a striker, defender, goalkeeper, etc.), practicing and training perceptive-cognitive-motor skills in order to convert them into skills (valid in all types of sports organizational entities: group, intergroup and singular).

Equipment and appliances used

- a. In anthropometric research [Nenciu, G., 2005]:
 - GPS 200 Postural Stability Analysis System (study the athlete in static balance),
 - Anthropometric frame of symmetry
 - Podoscope
 - Other devices-instruments: stopwatch, dynamometer, large and small goniometer, spirometer, measuring tapes of 5 and 10 m, caliper, tallimeter, compass diameter, metronome, electronic scale, simple 6 m ladder.
- b. In research and functional evaluation [Ionescu, A.; Caramoci, A., 2017]:
 - Aeroscan: allows the analysis of respiratory gases during physical exertion)
 - Minispir Light computerized spirometer that measures current or tidal volume (VT), expiratory reserve volume (ERV), inspiratory reserve volume (IRV), residual volume (RV), etc.
 - Pulse oximeter with Utech UT 100 sensor (provides instant, continuous and non-invasive measurement of hemoglobin oxygen saturation and heart rate)

- Zephyr performance systems: records and uses heart rate variability (HRV) as a tool to analyze the autonomic regulation system
- Treadmill H/P/COSMOS-MERCURY 4.0: movement capture facility and biomechanical analysis with multiple applications in: effort tests, creation of training programs, assessment of sports performance, medical recovery of the athlete-orthopedic, neurological.
- The Gyko Med S system: analyzes with great accuracy the deficit of musculoskeletal function
- Garmin Fenix 3 Bundle watch: it has 3 accelerometer-altimeter-barometer axes of high sensitivity with fast localization, helps athletes during leisure and high performances activities.
- BioFET: digital dynamometer - complex equipment that measures muscle strength and the frequency of muscle contractions

c. In motor research and evaluation [Victor, L., 2010].

- -OptoGait system (analysis of gait, dynamic balance and dynamic proprioceptive capacity
- - Witty Wireless training Timer equipment - evaluates reaction speed, reaction time, agility with the help of smart traffic lights and Witty timers

d. In research and evaluation of human performance [Neagu, N. 2012]; [Victor, L., 2010].

- Optojump device: optical analysis and measurement system that aims to develop specific and personalized programs for athletes, based exclusively on precise and objective information containing 41 test batteries aimed at measuring motor skills, speed with its forms of manifestation, muscular resistance, strength, power using as motor skills: walking, running and jumping
- Equipment HP COSMED T150 E LC med: it is a treadmill that allows the assessment of motor capacity without any risk, having an elevation of 0-25%, support bars for the hands, 28 stress test profiles.
- Garmin Fenix 5 multisport device: it is a watch intended for indoor or outdoor activities, which has functions for motorization of effort, functions regarding the location via GPS and Glonass satellite reception, functions for personalizing training programs and planning them (like exercise book)

e. In psychological and psychomotor research and evaluation [Hendrie, W. J.P. Pawliw-Fry, 2018]; [Neagu, N., 2012]; [Nunnally, J.C.; Bernstein, I.H. ,1994]:

- PSISELTEVA test batteries (alternative computerized system of sports psychological testing and evaluation in the field of athlete psychology and sports-professional orientation
- CAS++ evaluation platform
- Neuropsychological assessment battery for children aged 3-12 years (NEPSY)
- PED platform b

Methodology

The study was carried out in 2021 on a number of 124 subjects, male, aged between 10 and 14, members of some sports entities from Bucharest. Valid data were 34, as some respondents did not complete testing for all 16 anthropometric and functional parameters, or participation was derided by them. But for three parameters BMI, SPO2 and the Ruffier test all 124 respondents-athletes had valid data.

The individual evaluation was carried out within the Interdisciplinary Research Center of UNEFS in collaboration with the Sports Medicine Center - GRAL, after obtaining the consent of the parents and the informed consent of the evaluators-athletes. To obtain the necessary data, direct methods were used: anthropometric (height and weight) based on which the body mass index (BMI) and the O2 saturation in the arterial blood (SPO2) were calculated. Cardiac resistance was assessed using the Ruffier (IR) test.

This index provides exactly the necessary parameters, that is: knowledge of the tonic state of the myocardium before exercise (at rest), the ability of the myocardium to adapt to exercise, and the power

to return to normal after exercise. For this purpose, a standard exercise was used, consisting of 30 squats (according to the J.E. Ruffier method). The Ruffier index was calculated according to the formula: $IC = P1 + P2 + P3 - 200/10$ (where $P1$ = the number of pulses per minute at rest, $P2$ = the number of pulses per minute after exertion, in the first 10 seconds, $P3$ = the number of pulses per minute 3 minutes after exercise). The data collection was carried out with the help of the portable medical device - Oxi-Capnograph (Pulse Oximeter) MD-660P; device to which different peripherals can be connected to measure some parameters (SpO_2 , FC, CO_2 from exhaled air, FR) This is a non-invasive method that provides precise results that can be processed in real time with the help of the Smart Link V software application; application that converts data saved in physical curve information Through an easy-to-use interface, the user can store and long-term follow-up information on the dynamics of the tested parameters.

The statistical processing of the data was carried out with the help of mathematical models and Pearson correlation coefficients. To mathematically model, visualize, process the experimental data and to determine the law of mathematical variation of BMI (body mass index), IR (Ruffier cardiac resistance index), SpO_2 (oxygen saturation present in hemoglobin), am used variational mathematical calculation, using some methods of determining the laws of variation of these indicators (variables) with the help of 4 types of mathematical regressions: polynomial regression, logarithmic regression, linear regression and exponential regression [Chatelin, F., 2012].

The determination method consists in creating, within the Microsoft Office Excel software, a functional matrix of the $\mathbb{R}(m,1)$ type, i.e. m lines and 1 column, in our case 124 lines and 1 column $\mathbb{R}(124,1)$, where the figure of 124 represents the number of subjects with valid data and with the help of some functions in this program, XY Scatter for example, let's represent the graph, the law of variation related to the type of regression as well as the confidence coefficient R . The confidence coefficient R shows us the fidelity of both of the determined variation law, as well as the objectivity of the method of determining and representing the variation law of the studied parameters.

Results

For a sports manager, he can make early decisions related to the potential of the subjects, if it is possible to increase cardiac endurance through education, physical culture and adequate and adapted training, or the subjects are possibly without sporting potential and thus everything comes down to a practicing sport for "pleasure", without speaking of performance.

For the BMI body mass index, the graphic representation in the order of determining the valid experimental data resulted in figure 1 and figure 2. The performance of the determination of these measurements did not have a selection of the subjects, they were measured in random order. For visualization, mathematical modeling and graphic representation in order to determine the trend of BMI increase or decrease, or invariance, in the sample presented above, methods were used 4 of mathematical regressions.

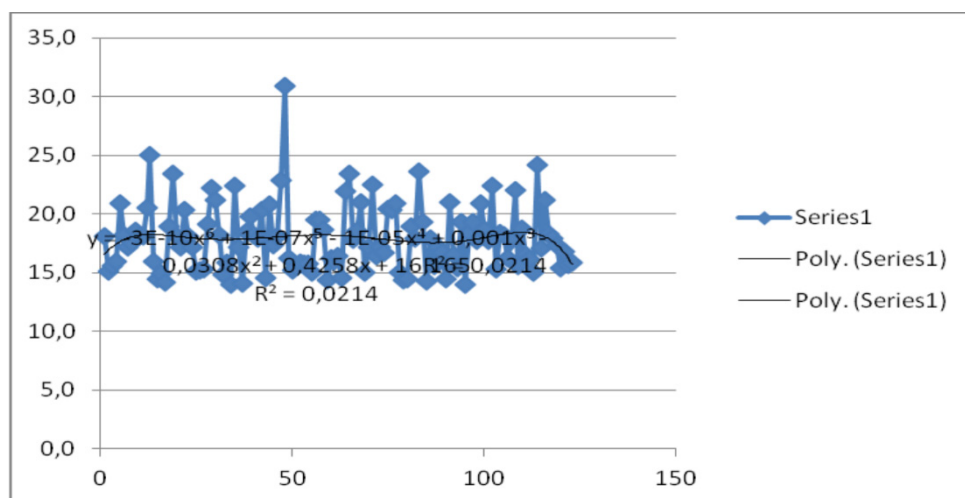


Figure 1. The law of variation of the body mass index MBI. Polynomial regression of order 6

From the processing in fig.1 we notice a very low index $r=0.1462$, a fact that does not indicate that the measured organisms are growing, in continuous anthropometric change, we do not have stable organisms, with completed anthropometric development. horizontal, which does not indicate that this sample of subjects does not have a significant differentiation of the body mass parameter, i.e. by extension the current generation of subjects does not differ from the generations before the Covid Pandemic. The graph was obtained with the help of the Trendline package by choosing the type of polynomial regression of order 2, from the Scatter functions in Excel. Data obtained from measurements were placed vertically and using the functions above, the graph was obtained, with the equation of the law of variation and the representation of the dispersion cloud in question.

Analogously, applying in the same way as for the graph in fig.1, where this time we applied another type of linear regression, we obtain in fig.2, another but similar graph, a horizontal-"stationary" graph, which it also indicates that in this generation there is no significant change in the BMI parameter, due to the Covid Pandemic or the different evolution compared to previous generations.

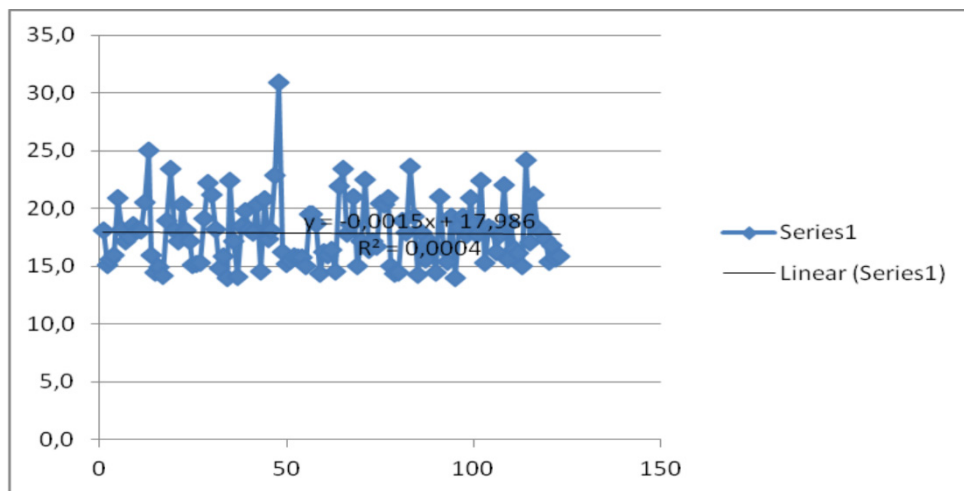


Figure 2. The law of variation of the body mass index BMI linear regression

We apply for the Ruffier cardiac resistance index (IR) in the same way the same Trendline package with different types of regressions, applying the XY Scatter functions and obtain the graphs in fig.3 and fig.4. with the laws of variation superimposed on them.

By applying the 2nd order polynomial regression as shown in fig.3 we notice this law of variation, it is coarse, it has a negative r index. This can be explained in 2 ways: either the regression is not suitable for the description of the IR variation, or the subjects do not have the adequate physical preparation and warm-up to start the measurements.

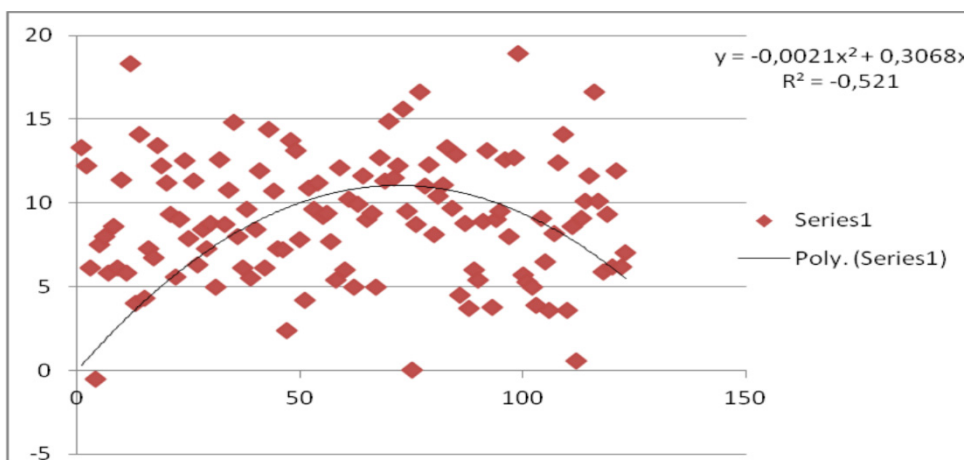


Figure 3. The law of variation of the Ruffier IR cardiac resistance index of the 2nd order polynomial regression type

For the experimental data in fig.4, after graphical visualization, we notice a "stationary" graph similar to a horizontal one. The law of exponential regression would reduce to a form of linear regression. And here the same thing is noted as in the BMI study, that it is a state of invariance. Biometrically speaking, it would have been unnatural to have such large jumps in the BMI and IR indices of the current generation compared to previous generations, or due to the COVID Pandemic.

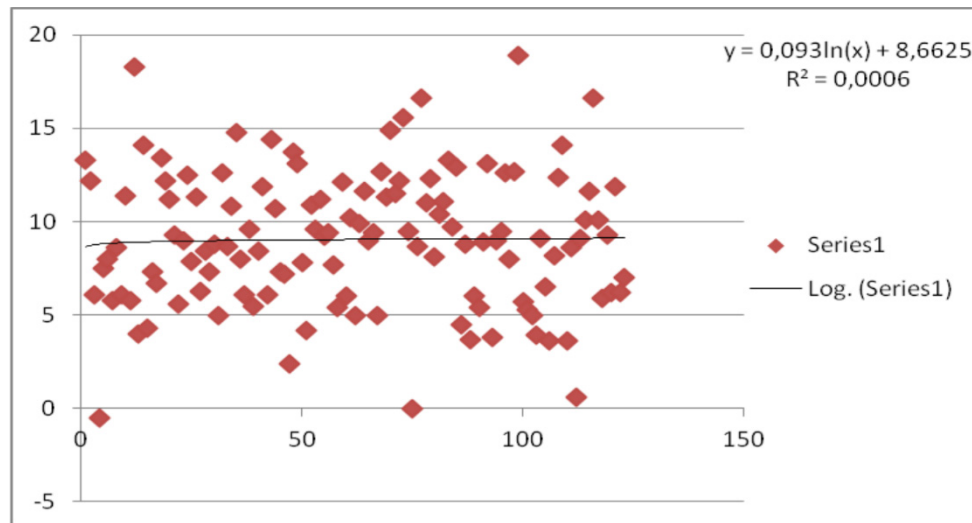


Figure 4. The law of variation of the Ruffier IR cardiac resistance index of logarithmic regression type

Conclusions

The present work by extension for all five directions of evaluation research allows the efficiency of modern management through the use of advanced equipment and devices:

- for the research-anthropometric evaluation, the sports manager has the undoubted possibility to decide, related to the athletes, their potential, and if it is insufficient where the sports activities must be improved, or if for the real performance that approach is worthwhile, or the athlete is limited to a practice without performance.
- for the research-functional evaluation, the same way the manager through these advanced techniques makes his management more efficient, he also knows what exactly he has to do to increase the sports performance, the direction of application of the physical training. All these researches indicate to the manager whether it makes sense to undertake effective training for that subject or not. These parameters objectively tell us the functionality of the athlete in question.
- for motor evaluation and research, this work allows, by using the same mathematical models, to establish the evolution or non-evolution of speed, reaction times, which in certain sports specialties (martial arts, football, handball, basketball, tennis, etc.) are overwhelmingly important elements
- the direction of human performance evaluation, in an analogous way to the above, allows the efficiency of the modern management act, using the interdisciplinary technologies presented in the devices and equipment section of this work
- the direction of psychological research-evaluation and psychomotricity also allows for the improvement and making of managerial decisions related to athletes. Managers analyzing with the help of advanced evaluation tools: analytical reasoning, working memory, cognitive inhibition, attention switching, decision-making capacity, organizational capacity (especially in group specialties: football, rugby, etc.) of athletes.

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ASPECTS REGARDING THE MANAGERIAL, TECHNOLOGICAL AND ECONOMICAL EFFICIENCY OF THE THERMO-ENERGY SYSTEM IN ROMANIA POST PANDEMIC PERIOD

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Abstract

Purpose – The article aims to present an analysis on the possibilities of technological, economic and managerial efficiency of a thermo-energy system.

Methodology/approach – The research methodology adopted was based on the critical analysis of the existing situation in the field and the proposal of efficiency measures.

Findings – Ascertainment of the analysis highlighted the need for modernization works, including new investments, as well as the improvement of the management system.

Research limitations/implications – The limits of the research and the application of the analysis results are of a financial nature. Underfunding of the field limits the possibilities for modernization and efficiency.

Practical implications – The practical implications of the research takes into account the placing of the clients of the thermo-energetic system in the center of attention and the improvement of the necessary financing system.

Originality/value – The originality of the article is based on an extensive documentation, and based on it a critical analysis of the existing situation with proposals for efficiency measures.

Key words: management, thermo-energetic system.

Introduction

The national thermo-energetic system has a special importance both for the economic field (industry, agriculture, trade) and for the entire population. Consequently, the efficiency of this system must be a priority (Deonise and Ioana, 2022).

The District Heating Program was approved by Emergency Ordinance no. 53 of June 25, 2019 on the approval of the Multiannual Program for financing investments for modernization, rehabilitation, refurbishment and extension or the foundation of centralized heating systems of localities and for amending and supplementing the Law on community services of public utilities no. 51/2006, published in the Official Gazette no. 548 of July 3, 2019, Part I.

Production Management (MP), by definition, is the totality of activities of organization and management of the industrial enterprise, activities carried out in order to efficiently perform its main function, namely the production function, which represents the main object of activity of the industrial enterprise (Ioana, 2016).

Production management is more comprehensive than general enterprise management (GMM), in the sense that the activities related to production management are more numerous and comprehensive than those of GMM. In figure 1 we present the scheme of the definition of production management.

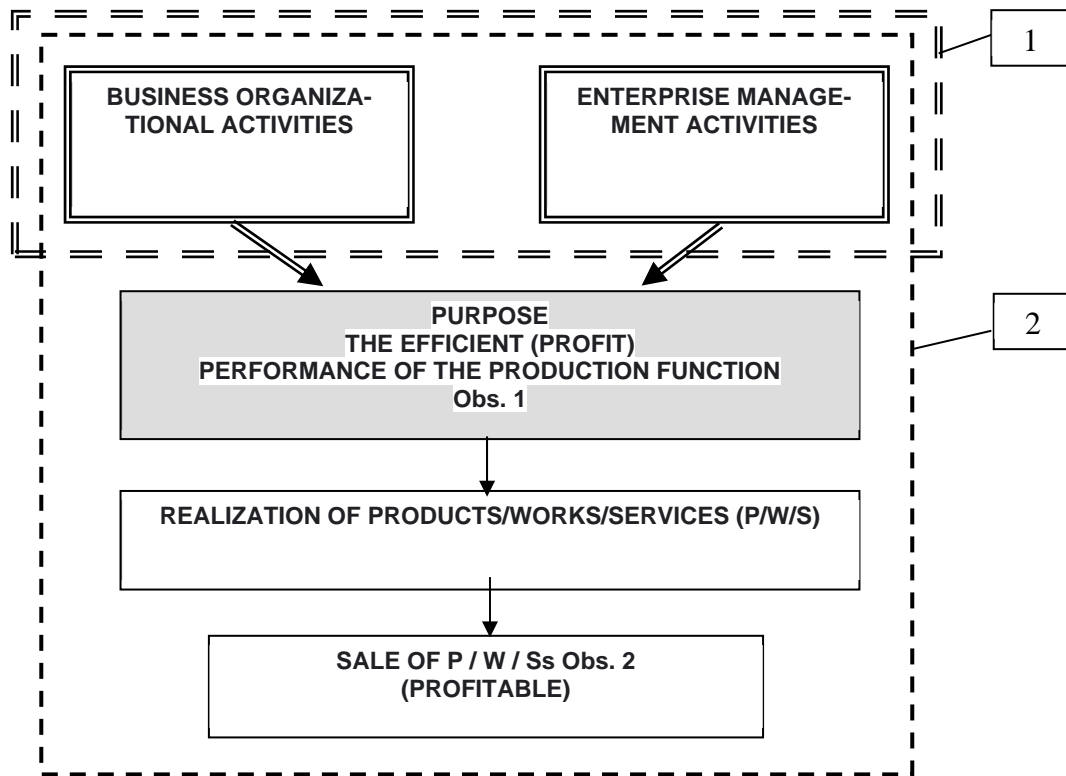


FIG. 1. Schematic representation of the definition of production management

1 - General Management of Enterprise (GMEs); 2 - Production Management (PM)

Obs. 1. A clear distinction must be made between the notion of function of the industrial enterprise (personnel function-human resource; financial-accounting function-financial resource; production function-material resource; commercial function; research-development-innovation-information resource function) and the notion of managerial function of the enterprise (forecast; organization; coordination; command; control).

Obs. 2. Production management activities must not end with the realization of P/W/S. It is very important to quantify (both quantitatively and qualitatively) the stage of sale of P/W/Ss produced and intended for sale. Thus, an own and real marketing study is implicitly carried out. Such a study can be carried out preferably through the Own Presentation and Sales Stores (MPPD), the so-called factory gates. The conclusions of this study represent mandatory and very useful needs for the new manufacturing program. In conclusion, tracking the sales of P/W/Ss produced must be a production management activity for a professional manager (craftsman).

Technical characteristics of basic energy equipment

The machinery and equipment specific to a thermal power plant are the following:

- the hot water boilers are monobloc type, made of steel in welded construction, with 3 distinct smoke roads and pressurized hearth;
- the boilers have the working parameters $P_n = 6$ bar and $T_t / T_r = 90 / 70^\circ\text{C}$ and the maximum combustion gas temperature at the exit is $\leq 185^\circ\text{C}$. Each boiler is equipped with a natural gas burner, modulating, with low emissions, electrical control panel, protection and signaling and with its own automation and protection installation. Depending on the thermal demand, the boilers come into operation in cascade, the thermal agent produced by the boilers being the primary agent for the heat exchangers;
- water circulation and recirculation pumps for each boiler;
- primary heat circulation pumps for heating heat exchanger;
- primary heat circulation pumps for a.c.c. heat exchanger;

- add-on water pump;
- the water softening station is an automatic two-column softening station equipped with ion exchange resins, which are alternatively regenerated, so as to allow the continuous supply of treated water;
- the expansion vessels are of closed type, with interchangeable rubber membrane, with capacity determined by the volume of water in the closed circuit installation.

The negative effects of the replacement of district heating installations in Romania

- The reasons that caused the disconnection (total or partial, with or without other sources of thermal energy supply) of an increasing number of apartments in the blocks of flats in Romania (about 800,000 out of a total of about 2,700,000) of to the centralized heat supply system are (Deonise and Ioana, 2022, Ioana, 2013, b, Ioana, 2012
- the increase in thermo-energetic tariffs, which determined the poor to give up any source of heating, and those with money chose as an alternative solution: to: pay less for maintenance costs, pay as much as they consume and have thermal comfort desired at any time of the year) installation of individual thermal devices (abbreviated as ITDs): "apartment microcentral" (AM), converters (C), supplied with natural gas, which evacuate the flue gases through horizontal chimneys (tubes) through the walls exterior of apartment buildings.
- The very aggressive advertisement of those interested in promoting ITDs, those who have presented only the advantages;
- deficiencies in the correct information of the population regarding the MULTIPLE NEGATIVE EFFECTS of the installation of ITDs in the blocks of flats;
- the lack of adequate measures of the decision-making forums regarding the PROTECTION of the entire population of Romania, because when some owners of a condominium install their ITDs (most often "apartment microcentrals" (AM) the negative effects are much amplified for the other co-owners to the central heating system;
- the ignorance by the Romanian authorities of the fact that the destruction of centralized heat supply installations is in contradiction with modern trends in the European Union.

LEGAL ASPECTS

The installation of ITDs by some owners without the consent of all co-owners of the condominium is an abuse, which violates the rights provided in the constitution of other owners

- Equal rights (art. 16 par. 1 and 2) "Citizens are equal before the law and public authorities without privileges and without discrimination"
- The right of property (art. 41) "Private property is equally guaranteed by law, regardless of the owner"; para. 6: "The property right forces you to respect the tasks regarding the protection of the environment and the assurance of the good neighborhood".

By evacuating the flue gas, the ITDs pollutes all the neighboring apartments, and the explosion of the ITDs or the gas supply installation can destroy the entire block.

That is why the installation of ITDs also endangers: the right to life, to the physical and mental integrity of the person (art. 22), the right to health care (art. 33), the protection of children and young people (art. 45).

The principle "I do what I want in my apartment" (as stated by those who install ITDs) can not be applied in a block in which through the initial construction the common facilities and the resistance structure (which includes the staircase and facade) is in the common property of all the co-owners of the condominium.

The realization of the gas installation for supplying ITDs on the staircase and the installation of AM or C with gas in the block apartments involves modifications of the common installations, of the staircase and of the facade), and maintaining the ITDs even without working, is a potential bomb "Which can explode at any time, leading to the destruction of the entire condominium.

The people who collaborate in the installation of ITDs with the evacuation of flue gases at the level where people take their breath, but especially the decision-making forums and the authorities with control functions of the Romanian state, which allow "gasification" of millions of citizens with burning of natural gas, could be considered complicit in human rights violations provided for in international documents. Art. 20 of the Romanian Constitution provides: "If there is a discrepancy between the pacts and treaties on fundamental human rights, to which Romania is a party, and domestic laws, international regulations have priority." Romania is a signatory of the Kyoto Agreement on limiting CO2 emissions, being also a member of the European Union.

The European Union's Charter states the "Precautionary Principle": governments must base their regulatory policy on the significant possibility of risk, acting even before all data is collected.

The installation of these ITDs, by polluting the environment, contradicts the European legislation to which our country has adhered (Deonise et al, 2022).

Violated laws and other legislation

- Housing law no. 114/1996 with the subsequent amendments stipulates in art.14 of Annex 2: „, no owner can violate or prejudice the right of common or individual property.
- Law 10/1995 on quality in constructions, Art.5: „... c) fire safety; d) hygiene, human health, restoration and protection of the environment.”
- Law 453/2001 for the amendment and completion of Law 51/1991 on the authorization of the execution of construction works, provides in art.1: “The execution of construction works is allowed only on the basis of a construction authorization”, and in Art.3: „, The building permit is issued for: a) works of... .modification,... .or repair of constructions of any kind, as well as of the installations related to them”.

Pollution by natural gas and its combustion products in individual heaters

Methane, in the form of natural gas, was until recently considered the cleanest fuel for the production of heat and electricity, but recent studies have led to the identification in flue gases of at least 70 species, some major, some minor including aromatic hydrocarbons. substituted aromatic and polyaromatic (PAH) carcinogens at which there is no maximum permissible concentration.

Natural gas contains methane as the main component, but also other hydrocarbons, odorants contain sulfur, radon (radioactive), as well as a variety of impurities depending on the gas source (organometallic compounds, etc.). in addition, in ITDs natural gas is burned in the air, which contains as a major component nitrogen, which generates nitrogen oxides. Combustion of methane involves dozens of chemical reactions, many of them based on free radical mechanisms, inherently free radicals are generated by burning natural gas in the air.

By evacuating the flue gases in the ITDs through horizontal chimneys that penetrate the exterior walls of apartment buildings in Romania, directly in the vicinity of windows, balconies and other openings in the building envelope, all pollutants are brought to the breathing area of people living in those blocks. Therefore, the concentrations of pollutants in the exhaust gases (chimney) ITDs should not be compared with the emission limit values (such as if the flue gases were removed through chimneys above the roof level), but with the emission concentrations (ie with the concentrations of pollutants in the chimney). breathable air.

Discussion and conclusions

District heating companies have as field of activity the production, transport, distribution and supply of thermal energy, for the population and economic agents.

They manage the district thermal power plants, the thermal energy transmission networks, the thermo-energetic points and the distribution networks of the thermal agent to the consumers.

The current sources of thermal energy production are CHPs, area and district heating plants. Area thermal power plants have become sources of thermo-energetic production by transforming thermal points and thermal modules into thermal power plants. This situation has emerged as a necessity in some localities due to the cessation of activity at CHPs and the reduction of heat consumption due to

the massive disconnections from the centralized heat supply system on the one hand and the existing long transport distances, on the other hand.

The measures found and recommended to improve the efficiency of the entire district heating system are unitary measures that require investment costs for their realization and measures related to the daily operation of the installations.

Among the measures that require investment costs we note:

- Rehabilitation of primary and secondary thermo-energetic networks by replacing classic steel thermal pipes and insulated with mineral wool with pre-insulated pipe;
- Restoration of the metering system on networks, respectively restoration of the metering loops;
- Metering of all thermo-energetic points on all circuits: primary circuit input, heating utility and domestic hot water output, addition to the heating circuit, own and technological consumption at the thermal point level;

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THE IMPACT OF THE COVID 19 ON SOCIAL ECONOMY ENTERPRISES IN ROMANIA

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Abstract

Purpose – *The objective of this study is to show how a social enterprise communicates social activities online according to its statutory mission, as well as their reporting against COVID-19.*

Methodology - *This study is exploratory and descriptive, it includes 67 social enterprises with web pages, out of a total of 2649 social enterprises registered in the Single Registry of Social Enterprises in Romania.*

Findings – *Most of the Social enterprises that have a website are small enterprises that have understood the importance of communicating social activities but also the impact of disseminating them to the all stakeholders.*

Originality/value – *This article contributes to the literature by evaluating the way in which social enterprise in Romania communicates social economy actions online, being the first representative study of this kind in Romania.*

Key words: *social economy; communication; website; COVID-19.*

Introduction

The social economy environment has started to develop considerably in recent years in Romania, as well as in the European Union (EU), with over 2 million social economy enterprises in Europe at the moment, representing 10% of all enterprises in the EU. More than 11 million people – around 6% of EU employees – work for social economy enterprises (EU, 2021).

Thus, social economy enterprises contribute to EU policies on employment, social cohesion, regional and rural development, environmental protection, consumer protection, agriculture, third country development and social security.

Starting from the previously presented, we conduct the study on the social economy sector, the database obtained from the unique record register of social enterprises in Romania, of the National Employment Agency (AJOFM), in June 2022, there were 2649 social enterprises (figure 1), of which most were established in Alba county (AJOFM, 2022).

In Romania, the emphasis is on the social economy as a tool for social inclusion and combating poverty, and activities that do not fulfill this role, but are recognized at European level, can be carried out according to the principle "what is not prohibited is permitted" as they are neither limited nor prohibited by the respective provisions (Haarich, et al, 2020). These activities will be carried out in compliance with other existing legal provisions, but they do not benefit from promotion and support through the support mechanisms of the Social Economy during the COVID-19 pandemic they were quite affected (OECD, 2020; Cioca & Bratu, 2021). In this way, the need to complete the existing legal provisions with an extended definition of the Social Economy, including other forms than those that directly contribute to social inclusion (Lakatos et. all, 2020) is found.

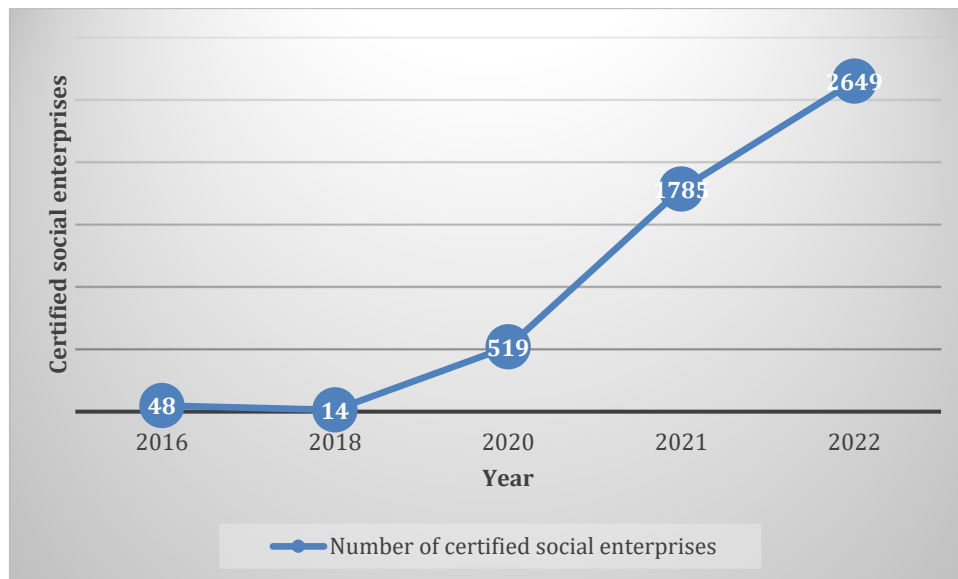


Figure 1. The evolution of the number of new certified social enterprises in Romania

This study, due to the importance of the development of the social economy sector in Romania, due to structural funds, as well as the technological impact, in order to investigate online communication, within social enterprises, in terms of the statutory mission, as well as the effect of the COVID-19 in their way of communication. Starting from the purpose and characteristics of our study, the data regarding the communication of social enterprises in Romania are collected from their websites.

Methodology

In order to carry out the current analysis regarding the online situation related to the reporting mode of the social economy of social enterprises, we selected the database provided by the National Agency for Employment, from the single record register of social enterprises. The database contains over 2649 social enterprises, which form the basis for opportunities related to the development of social business as well as commercial relations. The AJOFM database provides information on the social enterprise sector in Romania, such as the field of activity, certification as a social enterprise, social brand, social enterprise technical and financial data, but also contact information, but, unfortunately, only 67 social enterprises had a website dedicate to this social business. We set out to use the entire sample of 67 social enterprises in our study to analyze their websites to investigate how they communicate social economy activities, presentation style and their reporting on COVID-19. In the same way, we checked if the website of the social enterprises from the selected sample is functional, as well as the balance sheet in order to be able to grant the necessary resources for social development and statutory activity.

According to the Permanent European Conference of Cooperatives, Mutual Societies, Associations and Foundations (CEP-CMAF) (Lakatos, et. all, 2020), the broad prerogative of the social economy concept includes many types of activities and projects that are a catalyst for sustainable development of society through Social economy enterprises are economic and social actors with ramifications in all sectors, characterized primarily by their social mission and specific entrepreneurial objectives. "The social economy includes organizations such as cooperatives, mutual societies, associations and foundations. These enterprises are particularly active in certain areas such as: social protection, social services, health, banks, insurance, agricultural production, proximity services, education and training, culture, sports and recreational activities..." etc. To carry out the study we analyzed on the websites of social enterprises information on projects that can contribute to the social mission towards consumers, employees, as well as other interested parties. At the same time, we searched for information related to the activities carried out according to the social mission, in the communities where they come from, as well as in general (Aikat, 2000; Lakatos, et al. 2012).

In the current study, we will analyze the role that the Internet has in online communication of Romanian social enterprises. We chose social websites from Romania as a research topic, because they have taken a considerable lead in terms of development and how to adapt to new technologies. This study

shows how the accessibility of internet interacts and also analyzes how they relate to the social economy.

At the same time, we will analyze the importance and characteristics of online communications, taking into account the style and content of websites. Social enterprises invest more and more resources in different social economy activities, which indicates that social enterprises are aware of their social role and express their voluntary desire to publicly communicate their results, to impact stakeholders, as well as to obtain on the one hand added value and potential benefits for the social business.

The growing interest in the communication of social activities as well as social missions indicates that it becomes a need for social enterprises to communicate as actively as possible in the field of the social economy in order to be more competitive. Therefore, the fact that the Internet is more accessible in today's world and an indispensable way to communicate, will make our study more interesting for social enterprises, which have now either decided not to use this tool at the beginning of the journey, or consider it unimportant. Our study would also be useful in the evaluation/classification of social enterprises and as an example for the importance of using the Internet in their current activities. Social economy activities according to statutory missions, develop with small steps, but sustainable, and with the will to communicate and implement the social way, even starting from the side of social enterprises, especially with the help of a tool like the Internet. Therefore, in this study we analyzed the availability of the websites of these social enterprises, as well as the communication of their social economy activities on their one websites, in order to have the clearest and most complete communication situation of social enterprises from Romania. The study will provide a clearer situation for managers regarding how to improve the quality of social enterprise communication and the sites in terms of style and to convey a good image of social enterprise.

In this study, we will also expand the existing knowledge area in the specialized literature regarding the use of the Internet by social enterprises and the reporting of social economy activities. Communication regarding social economy activities is a little analyzed area (Chui et al., 2012) and online communication strategies are very little analyzed (Dachs, 2018), therefore this study adds to the existing specialized literature, analyzing how online communication is done in social economy activities of social enterprises in Romania.

In order to investigate how social enterprises in Romania communicate their social activities according to statutory missions on their websites, the study proposes the following questions in order to define the research methodology:

1. How obvious is the communication of social mission according to statutory missions on the websites of social enterprises?
2. Do social enterprises in Romania communicate their commitment?
3. How is social activity communication presented on websites?
4. How do social enterprises communicate the aspects related to COVID-19?

In carrying out the study, a coding system was developed. Thus, the analysis of the sites in the sample was carried out between June and July 2022. This analysis was carried out using the Internet through the Google Chrome search engine and a form filled in accordance with the information provided on the websites. This grid was developed according to the works analyzing web content (Pollach, 2003). The social enterprises were chosen randomly from a database provided by the National Agency for Employment, from the single register of records of social enterprises. The websites samples were examined in order to analyze the information about the activities of the social economy, in terms of presentation and their relevance to COVID-19.

The study includes 67 social enterprises with web pages, out of a total of 2,649 social enterprises registered in the Single Registry of Social Enterprises in Romania and is descriptive and exploratory. We should also highlighted that the analysis regarding the reporting of social activity according to statutory missions based on web analysis carried out on social enterprises in Romania is limited.

Results

From 67 social enterprises used in our analysis, 31.34% had a section dedicated to social activities. Before excluding the other social enterprises from our analysis, we used key words filtered such as social, social economy social entrepreneurship, social engagement, social development community and

philanthropy. The social enterprises in the final sample of 47 operated in several social activities according to the statutory mission.

In our analysis, we searched websites for links dedicated to aspects related to the social economy in accordance with the statutory mission. Out of the 47 sites, more than 46.27% social enterprises had a link on their page or had it mentioned in a subsection like "about us" / "home". At the same time the websites should have a separate section for information on social activities carried out according to the statutory mission their consumers can reach without significant effort. We see that these 25.37% social enterprises understand the necessity and importance of presenting their social engagement in a visible way, on their one website. More than a quarter of the social enterprises in the sample (37.31% social enterprises) present their work results in more than two pages and most of them adding some images. A total of 32.84% social enterprises had only one page with information. Regarding the number of pages dedicated to the social cause, it is a very simple and useful measure, but it is a measure open to criticism, so I used this method proposed by Aikat (2000).

To examine the communication content of online social economy activities, we also analyzed websites for additional social information such as press clippings, annual reports and awards. We can say that most projects can be considered charity events or philanthropic projects, we noticed that about a quarter of social enterprises (23.88%) declared their one projects and the greeting message or a visit from a personality on their website.

We can see that only 13.43% of social enterprises have a page dedicated to communication with COVID-19 prevention and the necessary actions. Other social enterprises have references to sources from newspapers or reports added to the social section that show the results of their activity (41.79%%). The findings of our analysis are summarized in Table 1.

Table 1. The results of the research regarding the communication of social enterprises in Romania

Indicators analyzed	No of social enterprises	%
Size of the investigated sample	67	2.53%
The website functionality	47	70.15%
Facebook pages	37	55.22%
<i>Features regarding the social economy and the impact of COVID-19</i>		
Websites with a social economy section	21	31.34%
Websites with a section on COVID-19	9	13.43%
<i>Characteristics of communication in the social section</i>		
In the main page	31	46.27%
In other pages	15	22.39%
<i>The degree of coverage with social information</i>		
1 page	22	32.84%
2-3 pages	25	37.31%
More than 3 pages	17	25.37%
<i>Social content related daily activity</i>		
Projects for the social economy	16	23.88%
Social mission communication activities	30	44.78%
Detailed report	12	17.91%
<i>The way of presenting social activities</i>		
Only text	14	20.90%
Text with visual effects	28	41.79%
Multimedia	11	16.42%
Feedback section	29	43.28%

Regarding the importance of the Internet, we can say that it is the environment with the most dynamic growth in all of history and continues to dominate the marketing budgets of social enterprises thanks to consumers who turn to it more and more. Thus, the design of content and websites, as well as advertisements, becomes imperative (Geissler, 2001; Arora et.all, 2020). Consequently, we studied the format and presentation style of documents regarding social economy activities according to the statutory mission.

To classify the presentation of social economy activities, we had three options: text, images, text accompanied by visual effects and multimedia. Related to the interactive features of the multimedia section, only 16.42% social enterprises used multimedia in their social activities section, in the form of video streaming. Regarding interactivity or features that facilitate two-way communication, only 43.28% of social enterprises had a feedback section, but most social enterprises in the sample had contact information where questions could be asked via e-mail related to general information and social economy activities according to the statutory mission.

More than 41.79% of the social enterprises used text accompanied by visual effects in the presentation of information related to the social activity according to the statutory mission.

Conclusions

The conclusions showed that the number of social enterprises with information about social activities according to the statutory mission on their sites being limited. Social enterprises do not maximize the potential of sites to their benefit in terms of style and quantity. However, the study provides an overview of the various social economy activities in Romania.

The research used the sample from the database of the single record register of social enterprises in Romania, of the National Employment Agency in Romania, so the results are representative, and they are consistent with the results of similar studies.

The study enriches the existing specialized literature and offers future research perspectives, as well as a good knowledge of the basic principles for a better use of web resources by managers. Also addressed, online social economy activities according to the statutory mission that could be interesting for organizations and tips in order to empower their websites for a better style and image of good governance received from feedback.

The study analyzes the current situation of online communication of social economy activities according to the statutory mission and shows that even social enterprises are much more concerned with the social and responsible communication of their activities with the various interested parties, through the Internet. Although the vast majority of social enterprises are small enterprises, the communication regarding COVID-19 was quite limited, an aspect that denotes either the limited degree of impact of this pandemic on daily activity, as well as an adjacent field that does not involve this aspect in daily activity of enterprises.

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BUSINESS ECOSYSTEMS IN HEALTHCARE INDUSTRY: A FRAMEWORK OF ANALYSIS

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Abstract

Purpose – The current research aims to discover the main differences between the proposed linear model of business ecosystems structures in comparison to the classical model.

Methodology/approach - The current research resides on the proposed business ecosystem linear model of analysis. Thus, in this paper the research methodology is based on literature review in order to identify the main components of the proposed framework. Also, there was conducted an exploratory research and based on case study approach there was highlighted the main differences between the proposed and classical frameworks by gathering evidences from two companies.

Findings – The main result was to provide a new framework of business ecosystem analysis based on the evidence from the Health Care Industry. Also, to highlight the relevance of the linear business ecosystem model development in comparison to the classical one within the current state of the art.

Research limitations/implications – To propose an integrative framework applied in Health Care Industry as the main collaborative instrument whose main objective is to provide relevant insights on business ecosystems performance.

Practical implications – From this point of view, the proposed framework of analysis could provide an important mechanism applied in different industries in order to ensure business sustainable growth and performance measurement.

Originality/value – This paper demonstrates the relevance and applicability of the proposed customized business ecosystem framework by gathering the evidences from Health Care Industry.

Key words: Business ecosystems, Health Care Industry, Performance metrics

Introduction

Business ecosystem concept gained an increased attention especially as successful and collaborative structure which aims to ensure not only financial results for engaged stakeholders, but also to increase products attractiveness for the final users. New technological changes (Caldwell, 2020), knowledge transfer processes, platforms creation, engaged collaborative experiences, actors' co-evolution (Peltoniemi, Vuori, 2004; Peltoniemi, 2005) represent a few principal motives for stakeholders' engagement into business ecosystems.

Proposed initially as a mechanism to explore and understand markets' dynamics (Moore, 1993), business ecosystem concept evolved as an integrative and complex framework. Interesting is the fact that business ecosystems development requires an integrative approach which transcends not only industry borders but also eliminates the limitation among private and public sectors (Autio, 2022). From this point of view, business ecosystem's main objective seems to be closely linked to the delivering the co-created products (Jacobides, et. Al, 2018; Jacobides, Lianos, 2021). Thus, from the structural point of view, a modular approach is preferred.

Especially interesting for business ecosystems theory remains the structural organization of an entire community of actors (Adner, 2017, Aarikka-Stenrose, Ritala, 2017), as such collaborative structure requires not only to define orchestration processes, but also to understand what actors are engaging into this type of collaborative structure. From this point of view, a business ecosystem was defined as a

community comprised of suppliers, potential clients, distributors, standardization bodies (Moore, 1993; Makinen, Dedehayir, ...), governmental agencies (Galateanu (Avram), Avasilcai, 2013). However, the fact that in a business ecosystem could be engaged various actors the most valuable for its development was to define what roles those actors adopted. Thus, in the scientific literature emerged the first classification proposed by lansiti and Levien, namely: keystones, dominators, niche players and hub landlords (lansiti, Levien, 2004a). This classification was followed further by Den Hartigh who reshaped the roles and proposed new ones, such as: the shaper, the adapter and the opportunist (Den Hartigh, Tol, Visscher, 2006). Both theories suggested that each engaged actor from business ecosystem adopts a specific role in the main processes within the structure in accordance with the business ecosystem life cycle stage.

From this point of view, business ecosystems are relevant for actors' development especially through the lens of organizational transformation at each stage of its development, the created opportunities and evolving environments. Despite the fact that the academic community agreed upon the importance of business ecosystem's structure, life cycle stages of development, adopted roles and governance mechanisms, there still remains to fill the gap about ecosystems configurations which could bring those four aspects together in a symbiotic way.

At this point, the current research aimed to highlight the relevance of business ecosystem configuration and to explore its development in the Healthcare industry based on the proposed framework. The most valuable result was to understand the linkages among ecosystem structure, actors adopted roles and ecosystem performance.

Business Ecosystems in Healthcare Industry

The interest for Healthcare Industry and its development increased especially last years. The pandemic situation emergence triggered a series of industrial changes, an accelerated digital transformation process and the development of new emergent business ecosystems. During that period of time, the Healthcare industry became a pillar of national economies. Thus, exploration of healthcare business ecosystems represents an anchor point within current research.

According to the UN International Standard Classification, the Healthcare industry is concentrated on three main sectors such as: hospital activities, dental and medical activities and other healthcare services (United Nation Statistics Division, 2022). This statistic comprises a classification of actors by main function and provided products. Another classification was provided by Global Industry Classification Standard, according to which the healthcare industry is defined by: healthcare equipment and services, and pharmaceuticals, biotechnologies and natural sciences (MSCI, 2022). This type of classification is especially relevant in defining the healthcare business ecosystems as it gave the opportunity in identification of ecosystems engaged actors. Although up until now business ecosystems were presented from the actors' point of view, within the current research a customized approach was taken by bringing in front three main components, namely (Hernandez, et.al, 2009):

- Workforce – the existence of specialized employees such as medical one, auxiliar medical employees and non-medical personnel (administrative workforce, specialized in medical issues, non-governmental agencies – Red Cross, Doctors without Frontiers, etc.)
- Services – the interface offered within the doctor-client's relations. Usually, in the healthcare domain it is about the services offered by primary care physician.
- Systems – can be seen as an important infrastructure which could ensure the clients' access for medical services.

Research Methodology

In researching business ecosystem concept the anchor point is to understand the concept of collective effort and how it is quantified in different contexts. Up until now, the qualitative approach is preferred, especially from the explorative point of view, as its main interest is to understand and to provide an in-depth examination of business ecosystem concept (Yin, 2011). Thus, the adopted research methodology was based on the exploration of the business ecosystem formation phenomenon within Healthcare Industry. From this point of view, first undertaken step was to explore the structure of the analyzed industry in order to discover its constructive architecture based on Healthcare Industry metrics. Based on the identified structure of analyzed industry there were highlighted two main components:

pharmaceuticals, biotechnology and natural sciences, and healthcare services and equipment. However, within the proposed framework the second component was used as a unit of analysis. Next step in developing the analysis framework was to highlight and customize research criteria. Thus, based on literature review, there were proposed three main criteria of analysis such as: healthcare workforce, provided services and healthcare systems, applied on healthcare services and equipment component as it shown in figure 1.

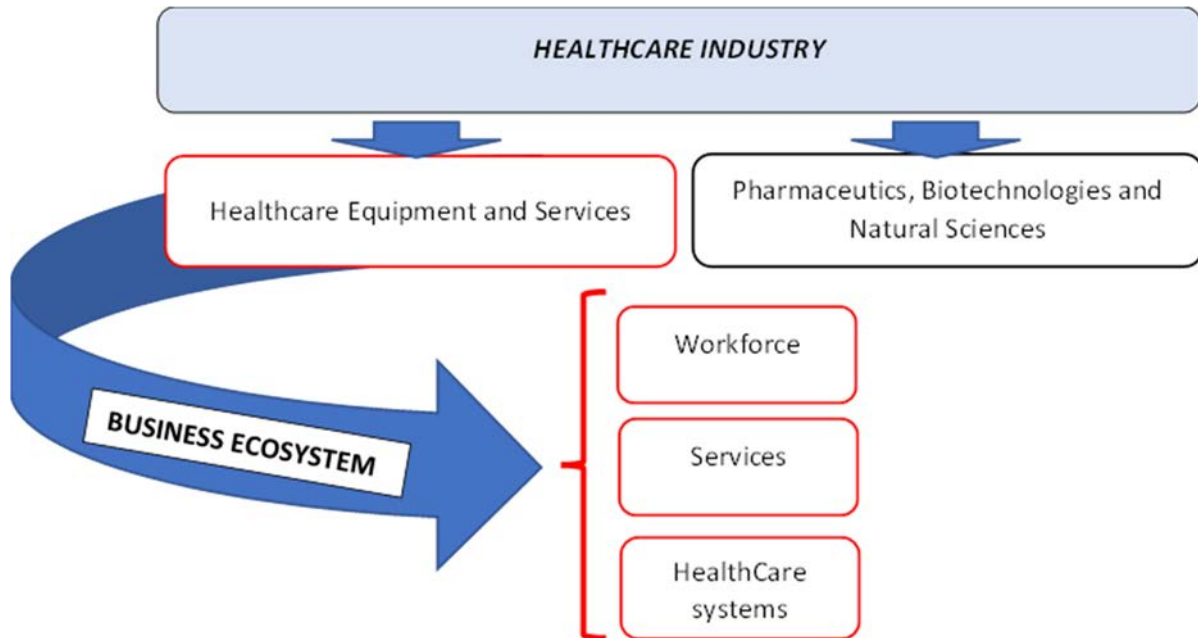


Figure 1: The Healthcare Industry Business Ecosystem Framework

Consequently, the research strategy was based on the following stages:

- *exploration of healthcare industry especially within the private sector* – at this stage there were identified the main components within the healthcare industry used in the analysis framework development;
- *assessment of existing business ecosystem models* – there were proposed the units of analysis with respect to the initial theory of business ecosystems. Thus, based on literature review there were defined customized metrics based on actors' roles, ecosystems lifecycle and performance metrics;
- *provide illustration of framework analysis implementation* based on case study approach on two companies from the healthcare industry.

The Healthcare Industry Business Ecosystems: Fresenius versus Diaverum case study

In order to highlight how business ecosystems were formed within the healthcare industry, there was chosen two companies whose main objective is to provide healthcare services. From this point of view, based on secondary data there was provided an analysis on companies who provide the dialysis services such as Fresenius and Diaverum.

Fresenius Business Ecosystem Development and Analysis

Founded in 1912, Fresenius represents one of the global leaders in healthcare services providers with presence on over 100 countries (Fresenius, 2022a). Its successful development is based on the attention provided for the quality of the provided healthcare services, innovation and efficiency of the medical act (Fresenius, 2022a). According to historical milestones, the company expanded its own ecosystem not only through mergers and acquisitions, but also by creating its own divisions (Fresenius, 2022b), presented in figure 2. This type of linear growth ensured the coverage of all essential healthcare and social wellbeing services and extended the ecosystem as it follows: treatment services (Fresenius

Medical Care), creating own supply division (Fresenius Kabi), development and management of own healthcare facilities (Fresenius Vamed) and division responsible for the whole hospital network (Fresenius Helios) (Fresenius, 2022a).

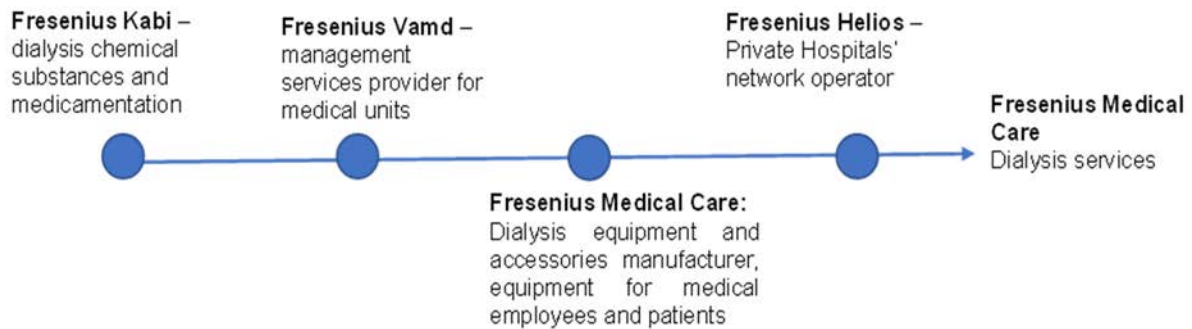


Figure 2: Fresenius Business Ecosystem Structure

By analyzing Fresenius ecosystem development and life cycle it seems rather as a linear integration process. According to the secondary data, Fresenius ecosystem was developed synergically and in a constant manner. Once the company entered on the market (the birth stage), it shaped its own role further. Basically, the growth stage comprises the timeline when the company became a manufacturer and equipment supply of healthcare services – the division Fresenius Medical Care. In the growth stage the company ensured the diversification of its own offer and activities. By becoming the global leader as a supplier, Fresenius entered in the maturity stage of development. It ensures its domination by becoming not only globally recognized supplier but also the manufacturer of healthcare services. This was the moment when Fresenius established long term collaboration with InterWell Health in order to ensure best nephrologists services (Fresenius Medical Care, 2022) and other meaningful partnerships especially in the domain of kidney treatment processes and replacement – Unicyte, Humacyte, eGenesis (Kossman, 2021) and it marked its transition from niche player to the keystone for other competitive ecosystems. The renewal of Fresenius ecosystem can be described by continuous effort to create new divisions. Also, during pandemic times, at this stage there were implemented digital platforms not only as the interface in relation medical staff-patient, but also digital warehouses of data (Stuard, Amato, 2021). Thus, by establishing divisions as Fresenius Helios and Vamed, the company gained new perspectives and opportunities to consolidate its position in Germany and Spain.

Consequently, by following life cycle stages, there can be seen that each actor from Fresenius ecosystem adopted its role as a part of strategic and sustainable growth goal, presented in table 1.

Table 1. The adopted roles of Fresenius business ecosystem actors

FRESENIUS	
Actors' roles	
Keystone players	Fresenius Medical Care
Niche players	Fresenius Medical Care Fresenius Kabi Fresenius Helios Fresenius Vamed
Dominators	Fresenius Medical Care
Hub landlords	Fresenius Medical Care

From the performance metrics point of view, Fresenius ecosystem seems to provide interesting insights. The company started its activity by providing dialysis services, developed until now in 4100 medical facilities in North America, Europe, Latin America, Asia Pacific and Africa. However, the continuous growth required also to expand their productivity line and diversification. From this point of view, by establishing Fresenius Kabi, the company ensured its own productivity by starting to produce specially designed medical equipment for dialysis and treatments for oncological and autoimmune diseases (Fresenius, 2022a). The resilience of this ecosystem can be explored through different metrics. From this point of view its survival rate, especially through pandemic times, is high as the company was able

to pass successfully the crisis of heparin (anticoagulant treatment for dialysis sessions) by initiating the production and introducing on the pharmaceutical market the Innohep (fractionated heparin that replaces the classic one in order to perform dialysis). Another key aspect which contributed to the development of resilient business ecosystem is closely linked by company development, namely: development of new divisions, creating its own business ecosystem actors and entering diverse niches, continuous diversification of the activities and products (medical services, healthcare equipment development, pharmaceuticals products, etc.)

Diaverum Business Ecosystem Development and Analysis

On the other side, the Diaverum’s business ecosystem model is rather based on classical model, initially proposed by Moore in 1993. Founded in Sweden in 1991, up until 2007 company concentrated its efforts on sustaining its own ecosystem at national level. However, at this moment it is globally present in over 24 countries, with over 12 thousand employees (Diaverum, 2022a). Diaverum’s core objective is to provide qualitative life-changing services (Diaverum, 2022a) and renal health services (Alharbi, A et al, 2020). Digitalization plays an essential role for the company, as it developed own healthcare platforms and application based on artificial intelligence (Diaverum, 2022b). Interesting is the fact that Diaverum’s business ecosystem structure depends on the development of collaboration with different partners and competitors such as: Nipro Japan and Fresenius Medical Care (dialysis equipment and accessories), Fresenius Kabi and Bbraun (medical equipment, medicamentation and chemical substances), as it is shown in figure 3.

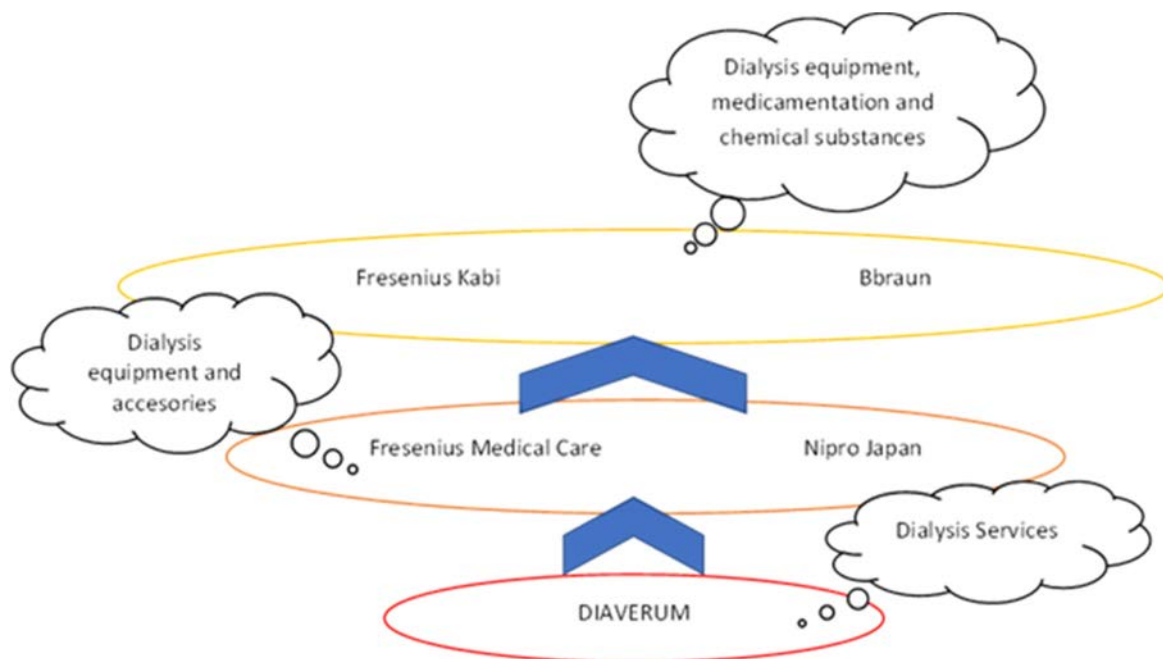


Figure 3. Diaverum Business Ecosystem Structure

Established in 2007, as result of acquisition of Bidgepoint, represents the anchor point in the development of Diaverum Ecosystem, as it marked the birth stage. However, since 2007 up until 2022, the Diaverum ecosystem expanded so that it is represented by 155 medical facilities in 14 countries (Diaverum, 2022a). According to the official statement, nowadays it comprises 469 medical facilities providing dialysis services with over 41 thousand of patients (Diaverum, 2022a). A change of paradigm on the development of Diaverum ecosystem can be seen at the maturity stage. In order to stay competitive within the healthcare industry, the company addressed to international suppliers such as Baxter, Nipro and Bbraun on from the dialysis equipment and accesories point of view (Diaverum, 2022d). Thus, in order to sustain its business ecosystem, Diaverum in the renewal stage started to incorporate ambulatory monitoring offices, as example the ambulatory network from South Arabia recognized and accredited by Joint Commission International (Diaverum, 2022a). This approach was preferred in order to attract patients to the Diaverum clinics and to get them to know the Diaverum’s staff, medical facilities and services offered by each clinic. Also, as a part of renewal ecosystem strategy the company engaged into long-term partnership with Spanish Confederation of Business Organization

(Diaverum, 2022e) In comparison with the previous case, the Diaverum ecosystem is highly anchored to the main goal, that is to provide dialysis services. From this point of view, the actors who are engaging into this ecosystem were mostly external partners, whose roles are presented in the table 2.

Table 2. The adopted roles of Diaverum business ecosystem actors

DIAPERUM	
Actors' roles	
Keystone players	Diaverum
Niche players	Nipro Japan Fresenius Medical Care Fresenius Kabi Bbraun
Dominators	Fresenius Medical Care
Hub landlords	Diaverum

Productivity metrics are strictly confirmed by the numbers stated officially, that means that Diaverum's ecosystem serves up to 41 thousand of patients through 469 medical facilities worldwide (Diaverum, 2022a). However, there is no change from the product or service point of view as Diaverum does not provide diversification of the services (other than dialysis treatment). Consequently, in order to sustain its own productivity Diaverum looked for another strategy which meant to establish nephrology monitoring points. From the resilience point of view, Diaverum followed up its long-term strategy. Basically, one of the strategic decisions during ecosystem's development was to address to various supply companies of medical and infusible treatments equipment and dialysis equipment (Diaverum, 2022d).

Fresenius versus Diaverum Business Ecosystems

In the current research there were presented two different business ecosystems within the healthcare industry. The main criteria of comparison between those two cases were: ecosystem structure, actors' roles within the ecosystem, the life cycle and performance metrics. In order to illustrate the main differences, there was realized an extensive analysis presented in the table 3.

Table 3. Comparative analysis based on the main criteria: business ecosystem life cycle and performance metrics

	FRESENIUS	DIAPERUM
Business Ecosystem Life Cycle Stages		
Birth stage	Once the company was founded	
Growth stage	Activity diversity by establishing 4 new divisions	Geographical expansion, new markets penetration
Maturity stage	Global leader in medical equipment and services	Recognition in top 3 on dialysis services
Renewal Stage	Diversification of the products, became major European operator of the network of private medical facilities	Extends its activity by establishing new monitoring points
Business Ecosystems Metrics		
Productivity		
• Product performance	Dialysis services at large scale	Dialysis services at middle scale
• Productivity change	Medical equipment manufacturing, pharmaceuticals products and hospitals' network	Dialysis services
• Innovation	Medication for oncological and dialysis treatments	Network of new monitoring medical point

Resilience			
• Survival Rate		High level of adaptation to the crisis moments within the healthcare industry	
• Ecosystem structure adaptability		Restructuring of the entire group by adding new divisions	Adaptability of the organizational structure based on new supply actor's emergence
• Predictability		Unpredictable growth rate and continuous innovation	Predictable growth rate based on the main goal
• Obsolence		Low level	High Level
• Learning from experience		Self-sustaining business ecosystem	Business ecosystem based on competitors' actions

Discussions and conclusion

Nowadays, the healthcare industry pasted and is passing continuous changing especially in the private sector. The current research aimed to illustrate how the concept of business ecosystem can be applied within this industry by putting an accent especially in the service part, for our case study we have chosen to concentrate on dialysis services. At global level, the dialysis services are ensured by various actors, however in top three are Fresenius, Braun and Diaverum. By analyzing the healthcare industry there was projected the initial framework, which stated clearly which are the main component of the industry to be further explored. However, the main concern of the analysis was concentrated on the healthcare services and equipment component.

According to the performed analysis there can be seen that Fresenius ecosystem is more evolved than Diaverum. Fresenius was rather concentrated on niche creation by restructuring and creating new and own satellites companies. From the point of view of sustainable growth, new divisions creation was the best choice, especially during pandemic times as the company created required dialysis and other medical equipment for own and not only use. Also, by expanding its own activity through new divisions creation, Fresenius could adopt within its own business ecosystem different roles, such as: keystone (by being a supply actor for other ecosystems), dominator (by owning its own manufacturing facilities) and niche player. This type of ecosystem growth seems to be more adapted to the current needs in the healthcare industry as it is suggestion a linear type of development. However, the main arising threat is about increasing the domination on other actors from the healthcare industry and obstruction of new entrants in business ecosystems. Basically, it is forming new type of self-sustainable ecosystem. The fact that is in opposite side than initial theory of what a business ecosystem means.

On the other side, there was presented the case of Diaverum, an ecosystem entirely based on providing the dialysis services. Diaverum's ecosystem was outlined according to the classical model, initially proposed by James Moore. According to the findings, this type of ecosystem within the healthcare industry is less performing especially within the current research. However, it seems interesting the fact that in order to sustain its own ecosystem, Diaverum had to increase the number of ambulatory offices. The main concern was to increase the collaboration with the final user from informative point of view. However, as for actor role, Diaverum represents a keystone especially in dialysis services and is an active actor in the relation with the academia on research part.

In terms of performance metrics, the comparative analysis shows a higher productivity for the linear model of business ecosystem growth, a higher resilience and innovation rate for the same type of framework. However, the classical model of business ecosystem presents more predictable mechanisms of business growth, as the unit of analysis was chosen from the private sector. The main distinction between those two ecosystems was rather about the used growth strategy.

As conclusion, there can be stated that linear business ecosystem is more performant than classical one, but with the respect to the adopted strategy: to be a keystone on own ecosystem or dominator.

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THE INFLUENCE OF THE COVID-19 PANDEMIC ON ROMANIAN ENTREPRENEURSHIP FROM THE PERSPECTIVES OF INNOVATION AND RISK-TAKING

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Abstract

Purpose – *This study endeavors to determine how Romanian SMEs have weathered the disruptions created by the COVID-19 pandemic taking into account the lockdown implemented as a consequence of the declared state of emergency.*

Methodology/approach – *We have considered it beneficial to observe both the capacity for innovation in the face of new challenges, and also the degree of risk-taking during a period marked by uncertainty. The survey method was used, with the questionnaire as a research tool.*

Findings – *The effects of the pandemic have negatively impacted 80% of the companies participating in this study. SMEs in Romania have a reduced capacity to take risks and to innovate in the post-state of emergency context.*

Research limitations/implications – *The study was conducted immediately after the end of the state of emergency, but the effects on companies may appear in the longer term.*

Practical implications – *The study was conducted in the period after the suspension of emergency measures imposed by the state of emergency, when effects and solutions presented themselves more closer to the state of emergency.*

Originality/value – *We connected the parameters of innovation and risk-taking with the effects generated by the imposition of the state of emergency.*

Key words: *entrepreneurial orientation, state of emergency, SMEs*

Introduction

The pandemic debuted in Romania at the beginning of 2020 after other European states had already been affected by the COVID-19 virus. Similarly to other countries impacted by it, Romania implemented several restrictive measures regarding both the isolation and distancing of individuals, and its economic activities. On March 16th 2020 a national state of emergency was declared that lasted until May 15th 2020.

The measures imposed by the government resulted in major changes from a cultural standpoint as well as in the way people interacted. Under such conditions, entrepreneurs as agents of opportunity and disruption have immediately felt the impact of these changes. Therefore, enterprises headed by entrepreneurs, depending on their methods of engagement and various intervening factors, may or may not have endured on the market, they have either prospered or experienced failures. In Romania, based on the research conducted, SMEs seem to have been considerably more affected by the COVID-19 pandemic than their larger enterprise counterparts. In this context, the current study intends to uncover the state of SMEs after the implementation of the COVID-19 emergency measures starting with an analysis of the specialized literature regarding the effects of the COVID-19 pandemic on SMEs, and also through a descriptive method of research using quantitative data based on a questionnaire geared towards entrepreneurs from different locations in Romania.

In order to assess the way in which SMEs have weathered the crisis generated by the COVID-19 pandemic, we have deemed it relevant to look at their entrepreneurial orientation, since it is the

prerequisite strategy in the face this type of crisis and of the consequent changes in the business landscape (Vanessa Ratten, 2020).

Entrepreneurial orientation “encompasses firm-level behavioral characteristics of engaging in product-market innovation, promoting innovative behavior within the firm, undertaking somewhat risky ventures, and being the first to come up with proactive innovations” (Wang and Altinay, 2012). Therefore, the main elements necessary for tackling the COVID-19 crisis include innovation and risk-taking.

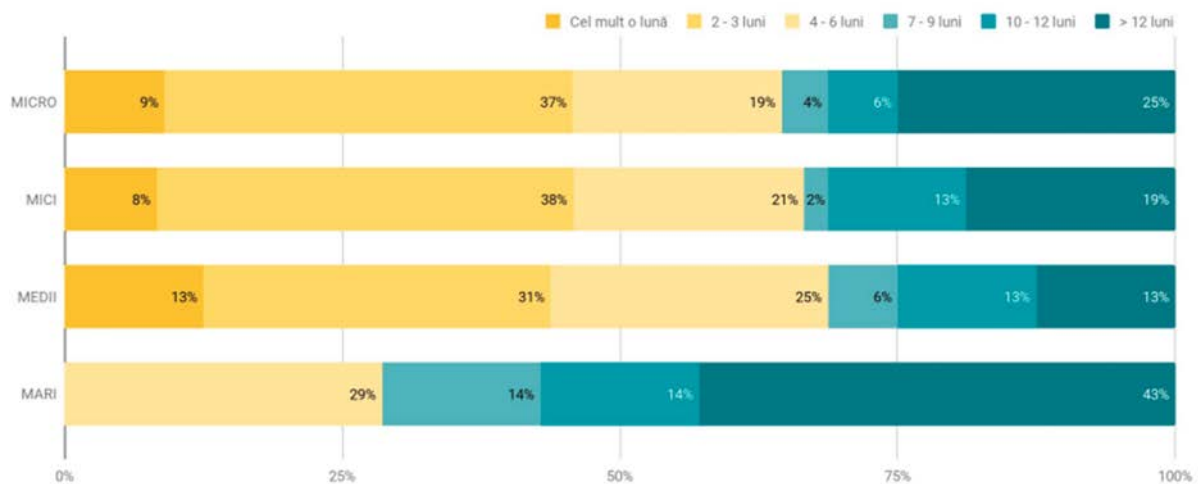
The pandemic changed the way in which economic activity is carried out, and a return to a pre-pandemic normal cannot be anticipated, as to this very moment the fight against the virus and its variants continues.

As such, it is of interest to identify existing opportunities and innovative solutions to be able to meet the new challenges generated by the COVID-19 pandemic. To this end, innovative thinking and a high degree of risk-taking are necessary.

A possible first step could be outlining SMEs from the perspective of their capacity for innovation and risk assumption, followed by innovation stimulation and risk assumption in areas where it proves necessary, and by their continuous search for new methods of innovation in the given context.

Literature Review

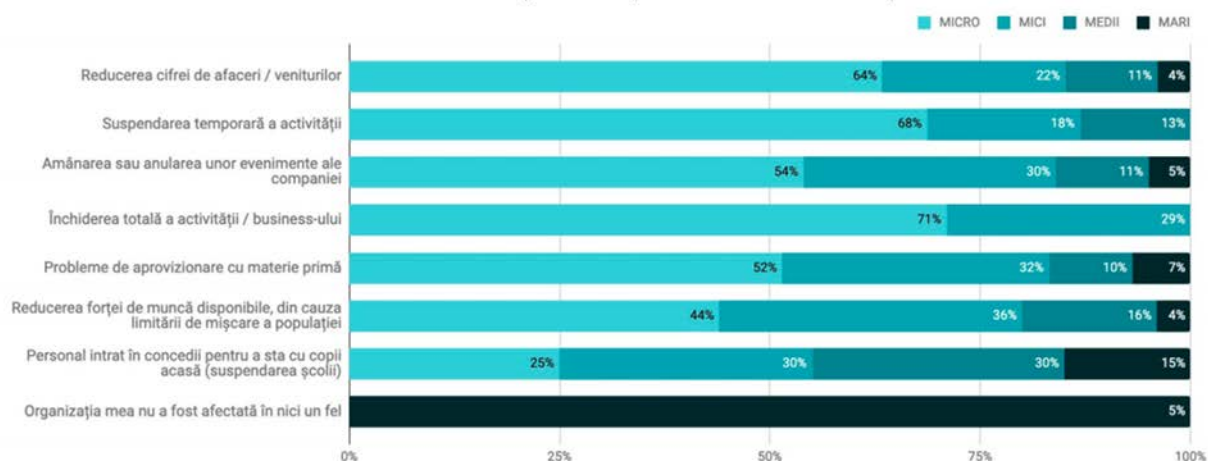
After more than a year and a half since the first reported COVID-19 case in Romania (February 26th) the consequences the business environment had to face are stark in light of the exceptional measures implemented meant to limit the spread of the virus. For the purpose of identifying these consequences, research studies have been conducted even prior to the first pandemic year’s end. One of these early studies was published by MKOR Consulting in 2020, titled “Impact of the COVID-19 Epidemic on the Romanian Business Environment”. According to this study, even at that point in time 91% of companies reported being affected by the Coronavirus epidemic, and 95% had taken some measures to endure in the face of the crisis brought on by COVID-19, the most frequent of which were financial measures, followed by measures of employee protection, and pivoting business activities. The study highlights the fact that resilience in the face of this crisis depends on the size of the organization, therefore, the larger the company the better chance it has at survival, as per figure 1 Crisis resilience based on the size of the organization.



Source: MKOR Study: *Impact of the COVID-19 Epidemic on the Romanian Business Environment*

Figure 1 Crisis resilience based on the size of the organization

Additionally, the impact affecting small businesses is much more significant compared to the one their larger counterparts experienced. The resulting impact decreases in intensity depending on the size of the type of organization as seen in Figure 2 Impact based on organization type.



Source: MKOR Study: *Impact of the COVID-19 Epidemic on the Romanian Business Environment*

Figure 2. Impact based on organization type

As a result of the research analysis carried out by MKOR, representatives of the business environment showcased limited trust in government institutions regarding the management of the COVID-19 crisis. The average trust level settling at 2.7 points of a total of 7. Many studies confirm the fact that multiple SMEs have been affected by the new environment brought on by the pandemic (Antonescu, D. 2020). The effects generated by COVID-19 in the SME sector have also been detected at the level of entrepreneurial initiatives, as irrespective of their legal status in March 2019, a 74% decrease was recorded the following year compared to 2019 (Antonescu, D. 2020 pag.19).

Unexpectedly, in March 2020 the number of company dissolutions and suspensions of activity decreased compared to March 2019. Despite its negative outcomes, opportunities generated by the COVID-19 crisis have also been identified. Some of these are the disruption of import supply chain which can lead to an increase sale of local products (Antonescu, D. 2020 pag.24), the increase of public investment in education, agriculture and the food industry, the stimulation of local consumption, the issuance of food vouchers to the unemployed, supporting large enterprises, promoting innovation for purchases and identifying innovative solutions in the fight against COVID-19.

Another noted opportunity lies within the IT sector for which this period has created the necessary contextual momentum to transition into its next level of development, of creating new products and services. Additionally, the telecommunications industry could also signal an opportunity since the need for a fast internet connection is larger than ever.

Furthermore, the National Institute of Statistics (NIS) put forth an experimental research paper titled *Experimental research: Assessment of the COVID - 19 impact on the economic environment in March and April 2020*. A relevant aspect is the timing of the research, the questionnaire was addressed to economic agents on the 17th to the 19th of March 2020 before other COVID-19 preventive measures were implemented.

The NIS study reveals a high degree of uncertainty regarding the future of business spanning March and April 2020, and an increase in uncertainty in April 2020 compared to March of the same year.

In 2021 a somewhat optimistic outlook returned among business leaders to the point where half of them anticipated a return to normal economic activity, as per the 2021 edition of the KPMG CEO Outlook Pulse.

According to the EY attractiveness study, in 2021 Romania benefited from an above average attractiveness compared to the European investor average, with 66% of investors planning to establish or expand their operations in Romania in the following 12 month, compared to only 27% in 2020.

Another research report regarding the COVID-19 pandemic's impact on Romanian companies was conducted by BDO Romania, Alexandru Ioan Cuza University Iasi and the Iasi Chamber of Commerce and Industry with the objective of evaluating the evolution of Romanian companies during the first year

of the COVID-19 pandemic (February 2020 – February 2021), and showcasing their outlook for that year.

The most highlighted success factors during the pandemic were teleworking, enactment of public health protection measures, and limiting investment and the quality of managerial decision-making.

In terms of opportunities, 28.7% of our respondents did not identify opportunities, while 11.9% did not need to search. Even so, based on the remaining answers, opportunities in the online environment, the emergence of new markets, as well as products for special needs have been noted.

Digitization and process improvement were identified as the strongest outcomes of the year 2021.

Theoretical Framework and Hypotheses

In this study the model of entrepreneurial orientation has served as a lens for the purpose of examining the association between innovation, risk-taking and the ramifications of the COVID-19 pandemic.

The model of entrepreneurial orientation comprises the methods, practices and styles of the decision-making process that entrepreneurs use in order to act entrepreneurially. In 1983 entrepreneurial orientation was defined by Miller as “an entrepreneurial firm is one that engages in product-market innovation, undertakes somewhat risky ventures, and is first to come up with ‘proactive’ innovations, beating competitors to the punch”. Based on this we can deduce the existence of three dimensions for testing entrepreneurship: innovation, pro-activeness and risk-taking.

The current study has taken on the two dimensions of entrepreneurial orientation, innovation and risk-taking starting from the fact that the COVID-19 pandemic is one of the most devastating crises of modern times, and as such, during turbulent times when organizations have to bear unforeseen changes, creativity is of crucial importance. Researchers have recognized creativity as a method of dealing with uncertainty by testing old hypotheses and trying out new ones (Ford, 1996). Therefore, creativity in turn requires the ability to innovate and try, and to take on risks.

As supported by recent studies of the COVID-19 crisis, innovation is crucial for companies not only to be able to endure, but also to be able to prosper in the post-COVID-19 world (Chesbrough, 2020; Cohen and Cromwell, 2020).

Innovativeness suggests a company's tendency to commit to and support new ideas, while risk-taking implies taking on large debts or making significant commitments in terms of resources by capitalizing on market opportunities. Innovation can be interpreted as being a creative thinking model that generates ideas for a company.

The resilience of small and medium-sized enterprises during crises has become a subject of research since the last global financial crisis of 2007-2008. Recent studies note that SMEs are heterogeneous and the way they approach the economic crisis caused by the COVID-19 pandemic differs (Lim et al., 2020). Thus, some studies note that small businesses are not directly affected by the negative effects of an economic crisis (Davidsson & Gordon, 2016) as a result of their high ability to identify opportunities (Beliaeva et al., 2020; Devece et al., 2016). Certain studies note that SMEs have the strength to overcome the COVID-19 crisis when they engage in organization-wide innovation (Morgan et al., 2020).

Therefore, according to various studies the existence of a financial crisis can represent an opening for opportunity for some SMEs, while for others it can be a threat, and in the current landscape the ability to innovate plays an important part.

The COVID-19 crisis is marked by uncertainty, since, unlike other crises, it is new and extends over an unpredictable period of time, significantly hindering future planning.

An entrepreneurial approach, an inclination towards innovation and risk-taking is required in order to deal with COVID-19. Institutional collaboration is also necessary to assist companies in such unprecedented situations

Research hypotheses of the present study are as follows:

1. The ability to withstand the COVID-19 crisis is significantly influenced by innovation

2. The ability to withstand the COVID-19 crisis is significantly influenced by risk-taking
3. Most companies have been impacted by the effects of COVID-19
4. Companies with a higher number of employees experienced a smaller impact on their business brought on by the preventive measures of COVID-19
5. Companies that introduced new concepts/services/products experienced a smaller decline in income compared to others that did not
6. Most companies found remaining in the market following the situation generated by COVID-19 to be more risky than entering the market
7. The activity of most companies underwent significant changes following the implementation of the state of emergency measures
8. Companies that benefited from government support anticipate a faster return to normal than those that did not

Methodology

The survey method was used, with the questionnaire as a research tool.

Sample and procedure

The participants of this study are Romanian entrepreneurs. The questionnaire was disseminated online on social platforms (LinkedIn and Facebook). The confidentiality and anonymity of the participants is guaranteed. The questions are close ended. The profile of respondents was selected according to their gender, age and the size of the company based on number of employees.

Findings

The effects of the pandemic have negatively impacted 80 percent of the companies participating in this study. The most affected areas of activity have been services – 45.5 percent and manufacturing – 36.6 percent. Among the most negative consequences are a decrease in turnover – 30 percent, unemployment – 20 percent, contract termination, cash flow problems, and suspension of activity – 14.9 percent each, respectively. The measures adopted to counter the effects of the COVID-19 pandemic include deferred payments, temporary paid leave, drafting programs and investment projects in order to obtain non-reimbursable funds, cost reduction, finding new buyers, and cost reduction for services. 95 percent of companies have taken measures to be able to withstand the current crisis. Companies that experienced a decline on March 1st 2020 compared to March 1st of 2019 estimated a continued decline for this year as well.

Conclusion and Future Directions

The effects of the COVID-19 pandemic have been felt globally due to the interconnectedness of economies worldwide, and Romania is no exception. All countries have intervened to mitigate losses in their respective national economies by adopting a series of fiscal measures aiming to diminish the effects of the crisis generated by the pandemic. But the measures that have been adopted to prevent the spread of the SARS-CoV-2 virus, such as social distancing, have led to the total or partial suspension of business activities of many companies around the world. Companies are facing financial adversity that is difficult to manage in this context, and with the surge of inflation a medium-term effect will be the increase of interest rates on deposits and loans.

After two years characterized by hesitancy due to the COVID-19 pandemic, 2022 is set to be a difficult year with many uncertainties, both at the business level and at the geopolitical level. The increase in interest rates in the context of rising inflation will mark a year in decline, our saving and investment behaviors will change. The impact of this crisis will not only be felt at the economic level, it will also influence all aspects of everyday life.

A first step towards recovery could be to direct economic activity towards sustainable development. The context of the COVID-19 epidemic, the war that is in full swing, and the recession that has spread worldwide could prove to be a significant moment for Romanian companies should they choose to seize the opportunity. They could gauge the gaps in the atypical challenges of the present context, and could strategically adapt and start developing sustainably, creating value for all stakeholders.

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APPENDIX

QUESTIONNAIRE

1. What is the current status of your business?
 - Active
 - Inactive
2. What is your number of employees?
 - Up to 10 employees
 - Between 11-50 employees
 - 50-250 employees
3. Has the number of employees changed because of the situation created by COVID-19?
 - NO
 - YES, the number has decreased
 - NO, the number has increased
4. How did you carry out your activities during the state of emergency (the first half 2020)?
 - Offline
 - Online
 - Both online and offline
5. Point out the degree of impact that COVID-19 and the implemented preventive measures have had on your business
 - Great impact
 - Medium impact
 - Small impact
 - No impact
 - It's too early for an evaluation
 - Other
6. In what way have COVID-19 and the implemented preventive measures affected revenue in the first half of 2020?
 - Revenue decrease up to 3%
 - Revenue decrease between 30-50%
 - Revenue decrease over 50%
 - Revenue increased
 - It's too early for an evaluation
 - Other
7. Have you accessed loans to deal with issues caused by COVID-19?
 - YES
 - NO
8. Have you adjusted your performance goals as a result of the situation created by COVID-19?
 - Yes, significantly reduced
 - Yes, moderately reduced
 - Maintained goals
 - Significantly increased
 - It's too early for such a decision
14. Has your company benefited from governmental support in order to overcome this situation?
 - YES
 - NO
15. Specify how your business has been affected by COVID-19 until now?
 - Decrease in demand for products/services
 - Increase in demand for products/services
 - Inability to meet contractual terms due to disruptions in logistics
 - Increase in human resource costs
 - Uncertainty and inability to make business decisions
 - Investments
 - Financial difficulties
 - Understaffing
 - Layoffs
 - Other
16. What company-wide measures have you implemented to prevent the spread of COVID-19?
 - Teleworking
 - Reduced working time
 - Reduced production / reduced commercial operations
 - Temporary reduction in production/interruption of commercial operations
 - International travel restriction
 - National travel restriction
 - Reduction / restriction of face to face meetings (events, conferences, meetings)
 - Diminished schedule
 - Sanitization of common areas
 - Providing hand sanitizers for employees working in the office
 - The use of masks and gloves
 - Other
17. If COVID-19 were to disappear, how long do you think it would take for your company to return to normal?
 - Less than 1 month
 - 1-3 months
 - 3-6 months
 - 6-9 months
 - 9-12 months

- More than 12 months
 - It's too early to predict
18. Is your business unable to cope, will you have to suspend activities?
- YES
 - NO
 - It's too early
19. Have you implemented new concepts to deal with COVID-19?
- YES
 - NO
20. Did you develop new services or products in 2020?
- YES
 - NO
21. Have you adopted a new business strategy to meet the challenges caused by COVID-19?
- YES
 - NO
22. Do your employees have the opportunity to implement new ideas within the company?
- YES
 - NO
23. Do you often adapt your products/services based on customer requirements/reviews?
- Often
 - Sometimes
 - Rarely
24. Have you changed your portfolio of services/products according to the new demands generated by the COVID-19 situation?
- YES
 - NO
24. Have you benefited from business development and innovation consulting?
- YES
 - NO
25. From your point of view which situation was more risky?
- Entering the market
 - Remaining on the market in the context of the COVID-19 situation
26. Do you use documents and established procedures to implement risk analysis?
- YES
 - NO
27. Specify your main area of activity:
- Agriculture, animal farming, fishing, hunting, forestry
 - Mining industry
 - The processing industry
 - Utilities sector (electricity, gas, water)
 - Construction
 - Wholesale and retail
 - Transportation and distribution
 - Hospitality and catering
 - Finance and insurance
 - Real estate
 - Education
 - Health and social care
 - Other
28. Specify your gender
- Female
 - Male
29. What is your age group?
- 18-25
 - 25-40
 - 40-60
 - over 60
30. When did you start your business?
- Before 2000
 - 2000-2019
 - 2020-2021

OPPORTUNITIES FOR THE COMPANY IN THE PANDEMIC AND POST PANDEMIC PERIOD

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Abstract

Purpose – The aim of the research paper is to conduct a case study on how a construction company reconfigured its business based on the opportunities generated by the COVID-19 pandemic.

Methodology/approach - The research methodology applied in the paper comprises theoretical and applied research methods and techniques, implemented through the bibliographic and case study method.

Findings – Using SWOT analysis as a strategic planning tool, the management team “took advantage” of the challenges of the COVID-19 crisis, managing to adapt to the needs of the population during this period and bringing the company significant increases in turnover and profit during the pandemic and post-pandemic period.

Research limitations/implications – The management tools presented in the paper can be used by the managers to inform managerial decisions, both in setting short-term objectives and in planning long-term development strategies.

Practical implications – The case study has a high degree of practical involvement, based on practical management tools used in the company and analysis of economic and financial indicators.

Originality/value – The originality of the paper lies in its analysis of how society has benefited from the opportunities of the pandemic and post-pandemic period.

Key words: post-pandemic, opportunities, management.

Introduction

The COVID-19 pandemic has created a global crisis that impacts every individual, institution and organization. The Covid-19 crisis has had a strong impact on the medical, social and especially the economic environment worldwide. The economic impact was not caused by the pandemic itself, but by global measures taken to control the pandemic.

Although the impact of the COVID-19 crisis is now being felt in the post-pandemic period and is having a negative effect on the economy, there are companies that have found opportunities for business development in the post-pandemic period.

References in text

Crises affect private companies as well as public and administrative institutions, causing changes in their evolution. The issue of crises thus require a detailed analysis of how companies use specific methods of crisis management and substantiation of a decision in times of crisis. (Manciu, et all, 2016a)

The quality of the decisions and their substantiation in times of crisis plays a decisive role in the trajectory of the companies. Getting businesses through periods of crisis means maintaining economic performance through the management methods and techniques used in decision-making. (Manciu, et all, 2016b)

The disaster theory literature points out that financial issues and physical resources allow small firms to be more resilient during crises. (Belitski, et al, 2021).

Opportunities in the pandemic period

The COVID-19 pandemic started at the end of 2019 worldwide and in Romania at the beginning of 2020. During the pandemic, a number of restrictions and health protection measures were imposed, which were opportunities that Atlas Sport's management team took advantage of both during the pandemic and post-pandemic period.

Using management tools such as SWOT analysis and relying on the resources already existing in the company: specialised sales staff, suppliers, transport network, access to e-procurement system, etc., the management team understood the opportunity generated by the pandemic, the need for protective equipment, and made the optimal decision to develop a new department in the company to maintain or increase the level of managerial performance during the pandemic.

Atlas Sport has kept its core business sports construction, but the new medical equipment supply business is perfectly in line with the health protection requirements generated by the restrictions imposed during the pandemic period, which brought the company a considerable evolution of its financial indicators in the first year of the pandemic.

In order to better understand how the management team based its decision to create a new department and choose a new business area we have reproduced below the SWOT analysis, which is “a key tool used by businesses for strategic planning” (Benzaghta, et al, 2021).

“The objective of a SWOT analysis is to use the knowledge an enterprise has about its internal and external environments and formulate its strategy accordingly” (Sammut-Bonnici and Galea, 2015), thus in formulating the objective to enter the new market, the management team carefully analysed its internal environment, with strengths beneficial to achieving the strategy, being helped by the immense opportunities in the external environment generated by the evolution of the COVID-19 pandemic.

Table 1. SWOT analysis of the ATLAS SPORT SRL company during the pandemic period

Strengths	Weaknesses
<ul style="list-style-type: none"> ✓ Existence of a department specialised in direct sales (Business to Business, Business to Government, Business-to-Consumer) ✓ Existence of a department specialised in public tenders and use of SICAP (E-procurement system) ✓ Existence of a database with a large number of public institutions in Romania (town halls, schools and high schools, etc.) ✓ Existent connections with the suppliers in China (the main exporter of health protection products) ✓ Knowledge of the transport networks China - Romania ✓ Knowledge of import conditions and customs procedures 	<ul style="list-style-type: none"> - Lack of experience in selling medical and protection equipment - Lack of technical knowledge in the medical field - Lack of contact details for beneficiaries of medical equipment - Lack of authorisations and approvals required for the supply of medical equipment
Opportunities	Threats
<ul style="list-style-type: none"> ✓ Introduction of restrictions and health protection measures in all institutions and public places as a result of the COVID pandemic ✓ Increased level of health protection in all health facilities following the evolution of the COVID-19 pandemic ✓ Sharp increase in demand for health protection products ✓ Rising prices in the health protection equipment market 	<ul style="list-style-type: none"> - Production shutdown in many parts of China (the main exporter of medical and health protection products) due to the COVID-19 pandemic - Congestion on the China-Romania sea route and delays in product deliveries - Medium to long term uncertainty based on the uncertainty of the evolution of the COVID pandemic

Along with the restrictions generated by the COVID-19 pandemic, a series of health protection measures were regulated in all public places in Romania, as well as increased protection in medical institutions, which generated a sharp increase in demand for medical products and health protection on the market. These are the main opportunities generated by the pandemic that Atlas Sport SRL has capitalised on during the pandemic period, relying on its strengths, namely specialised sales and tendering departments, suppliers, transport networks, access to the e-procurement system and the existence of a database of public institutions in Romania. Thus, in the midst of the pandemic crisis, the company reconfigured its business generating a significant increase in revenue in the first year of the pandemic.

Opportunities and threats during the post-pandemic period

At the end of 2020, the management team again made a significant strategic development decision to transform the newly created department at the onset of the pandemic into a stand-alone company. Thus Atlas Medical SRL, a supplier of medical protective equipment, medical devices and disinfectants, was created. Thus, the “reshaping” during the pandemic was not temporary and became permanent in the post-pandemic reality.

Today, the weaknesses listed above have become strengths of the newly created society, based on the experience of the pandemic period. Thus, during the pandemic, the sales team built up experience in selling medical and protective equipment and gained technical knowledge in the medical field, created the necessary database of direct recipients of medical equipment and obtained the necessary authorisations and approvals to supply these types of products.

With the end of the pandemic, the threats presented earlier in the SWOT analysis have almost completely disappeared and in the post-pandemic reality have been replaced by the existence of competition, the entry into a period of economic recession as a result of the pandemic crisis and the war in Ukraine.

The post-pandemic opportunities that the newly created company can benefit from, given its strengths, are represented by the continued need to develop and modernise the medical infrastructure in Romania.

Table 2. SWOT analysis of the ATLAS MEDICAL SRL company during the post-pandemic period

Strengths	Weaknesses
<ul style="list-style-type: none"> ✓ The existence of a department specialised in direct sales (Business to Business, Business to Government, Business-to-Consumer) and public tenders and the use of SICAP (E-procurement system) ✓ Existence of a customer database ✓ Existent connections with the suppliers in China (the main exporter of health protection products) 	<ul style="list-style-type: none"> - Permanent need to improve technical knowledge in the medical field - Low market share as a new market entrant - The need for local suppliers to shorten delivery times
Opportunities	Threats
<ul style="list-style-type: none"> ✓ Continuous need to develop and modernise the medical infrastructure in Romania 	<ul style="list-style-type: none"> - existence of competition, - entering a period of economic recession as a result of the pandemic crisis and the war in Ukraine

Analysis of economic and financial indicators

Atlas Sport SRL is a company operating in the field of construction, specialising in the construction and landscaping of sports fields and playgrounds for children. In this phase of the case study we present an analysis of the main economic indicators over the period 2014 - 2021, thus capturing their evolution both in the pre-pandemic and the pandemic period.

From the data presented above, there is a continuous increase in turnover since its establishment until 2020, when it recorded the highest value since its establishment, namely 43,439,710 RON. The graph above shows a dramatic decrease in turnover in 2021 compared to the previous year 2020, when turnover doubled compared to the previous year 2019.

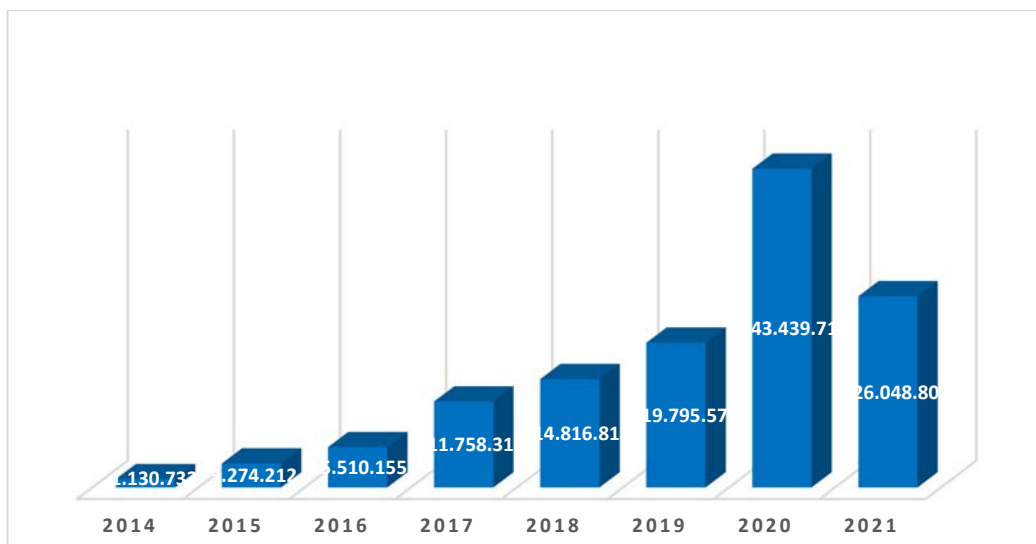


Figure 1. The evolution of Atlas Sport's turnover in the period 2014-2021

Given that the medical equipment sales department was set up during 2020, an activity which in 2021 was transferred to Atlas Medical, for these two years we carried out a detailed analysis of the composition of turnover. Thus for the year 2020 we have broken down the income from the execution of works and the income from the sale of goods – medical products, and for the year 2021 we have added the turnover of the newly established company Atlas Medical.

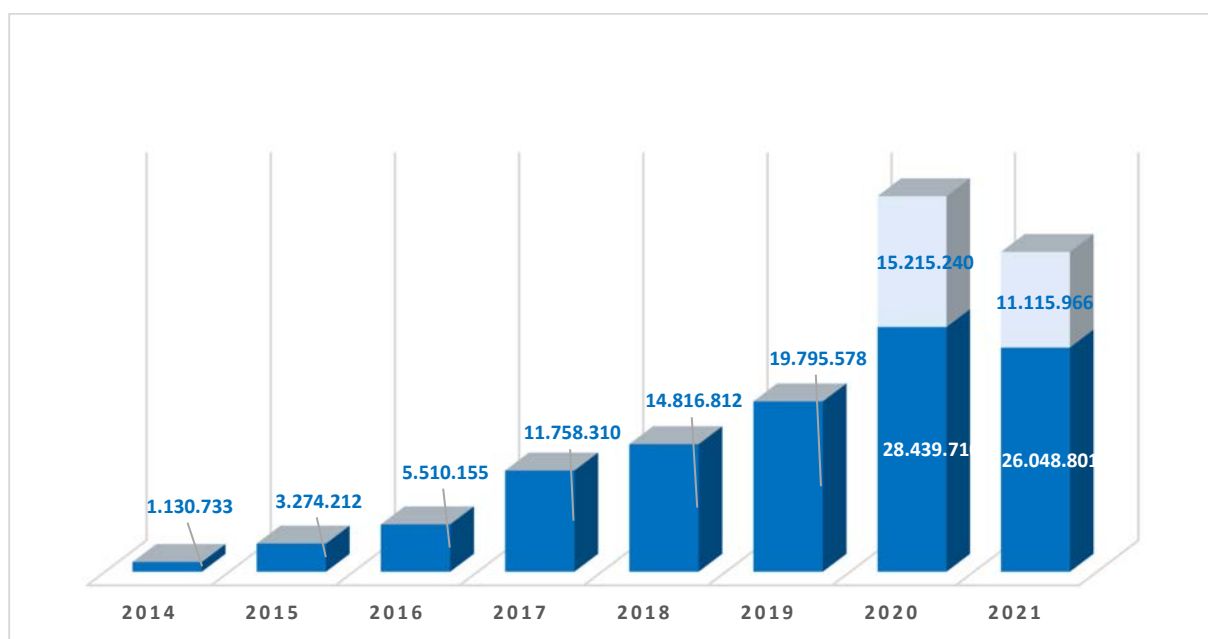


Figure 2. Evolution of Atlas Sport's and Medical's cumulated turnover in the period 2014-2021

Breaking down revenue by structure, there is an increase in revenue from the execution of works in 2020 compared to the previous year, but the increase is only 44 percent. Taking into account the turnover achieved by Atlas Medical in 2021, we notice a decrease in the cumulated revenue of the two activities by 22 percent in 2021 compared to 2020.

In order to calculate the indicator Size of profit we have taken into account the data in the following table, expressed in RON:

Table 3. The net profit of the company Atlas Sport in the period 2014 – 2021

Year	Total Income	Total Expenses	Net Profit
2014	1,130,765	970,951	138,005
2015	3,274,756	2,435,364	707,736
2016	5,591,627	3,992,149	1,360,254
2017	11,918,662	9,648,686	1,940,033
2018	15,214,424	13,935,747	1,093,614
2019	20,225,670	16,222,269	3,445,592
2020	44,011,720	32,988,126	9,617,645
2021	32,153,743	28,723,026	3,012,314

The analysis carried out on the net profit recorded by Atlas Sport SRL in the period 2014 - 2020 shows a permanent evolution of it, with only one decrease in 2018 when the profit decreased by 44 percent compared to the previous year. This year's profit decrease was followed by significant increases in the following years, i.e. an increase of 3.15 times in 2019 compared to 2018, and in 2020 the company recorded the highest amount of profit, i.e. 9,617,645 RON, with an increase of 179 percent compared to the previous year. After this significant increase in 2020, the company registered in 2021 a huge decrease of profit, recording a value of only 31 percent of the value recorded in the previous year.

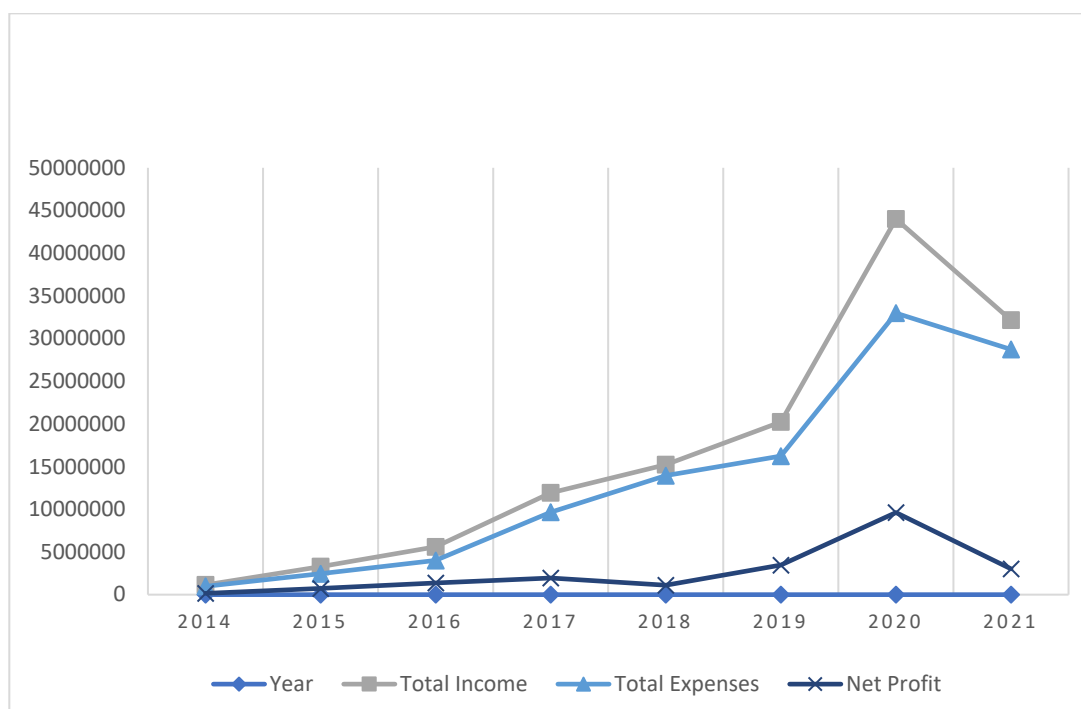


Figure 3. Comparative evolution income - expenses - profit in 2014 -2021 - Atlas Sport

Table 4. The inflation rates for the period 2014 -2021

Year	The inflation rates
2014	1.1
2015	-0.6
2016	-1.5
2017	1.3
2018	4.6
2019	3.8
2020	2.6
2021	5.1

Source: <https://insse.ro/cms/ro/content/ipc%E2%80%93serie-de-date-anuala>

The inflation rate must also be taken into account in determining the real profit of the company. The following table shows the inflation rates for the period 2014 -2021 taken from the National Institute of Statistics. (Table 4)

Using the previously calculated net profit and the annual inflation rate we calculate the real profit of the company using the following formula:

$$\text{Real profit} = \text{Net profit} - (\text{Net profit} \times \text{Inflation rate})$$

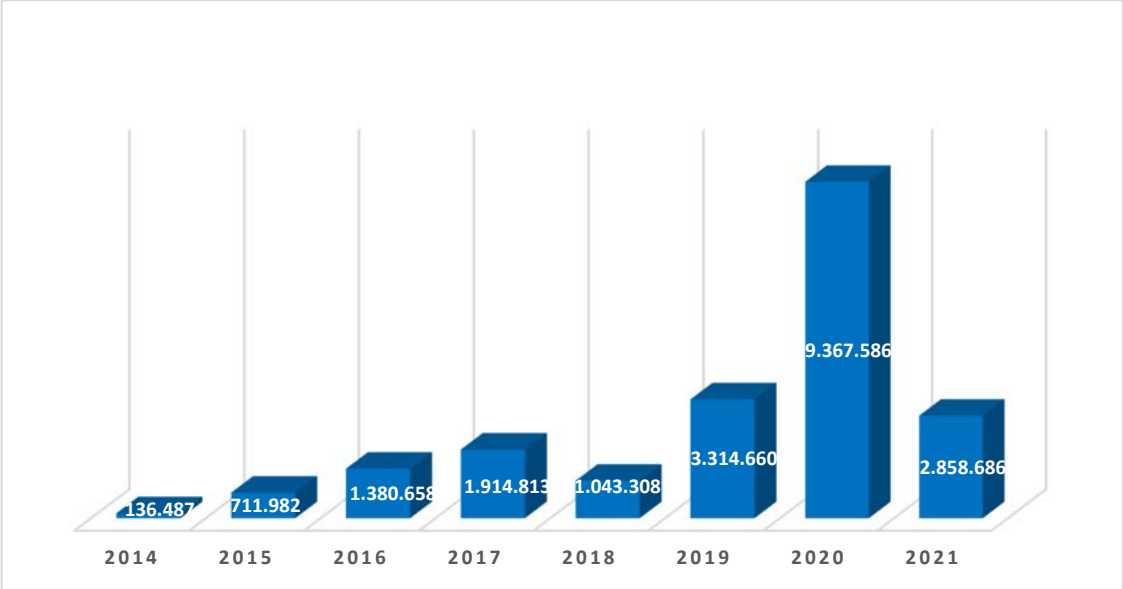


Figure 4. The evolution of Atlas Sport's real profit in the period 2014-2021

Given that the activity of selling medical protection products has been transferred to Atlas Medical, we also took into account the profit of 2,725,868 RON made by Atlas Medical in 2021. Thus, taking into account the values of the profit recorded on both companies, we obtain a total of 5,738,182 RON, representing 60 percent of the value of the profit made in 2020.

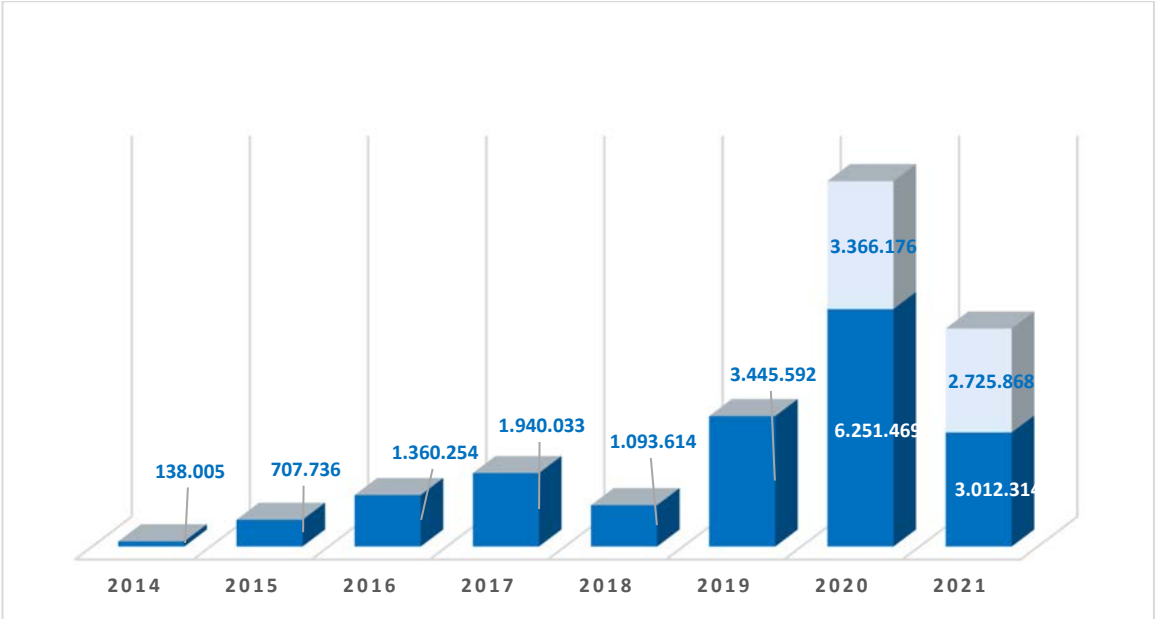


Figure 5. Evolution of Atlas Sport's and Medical's cumulated profit in the period 2014-2021

In order to calculate the financial return we will use the calculation formula:

$$\text{ROE} = (\text{PN} / \text{CPR}) \times 100.$$

Thus, for the calculation we take the value of net profit and equity from the financial statements.

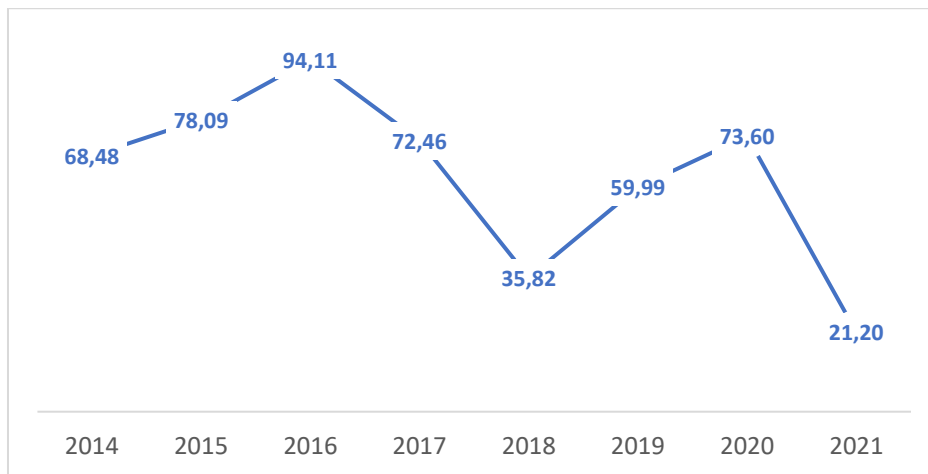


Figure 6. Analysis of financial return in the period 2014 - 2021 at Atlas Sport SRL

"The financial rate of return – ROE – expresses the degree to which the firm's equity generates net profit" (Gomoi, 2021). The analysis shows a maximum financial rate of return recorded by Atlas Sport in 2016 of 94.11 percent, with the lowest financial rate of return of 21.20 percent recorded in 2021.

Another indicator we looked at is the average number of employees, an indicator that was continuously growing between 2014-2018. The maximum value of 74 employees was recorded in 2018, followed by a decrease in the number of employees, reaching an average of 50 employees in 2021.

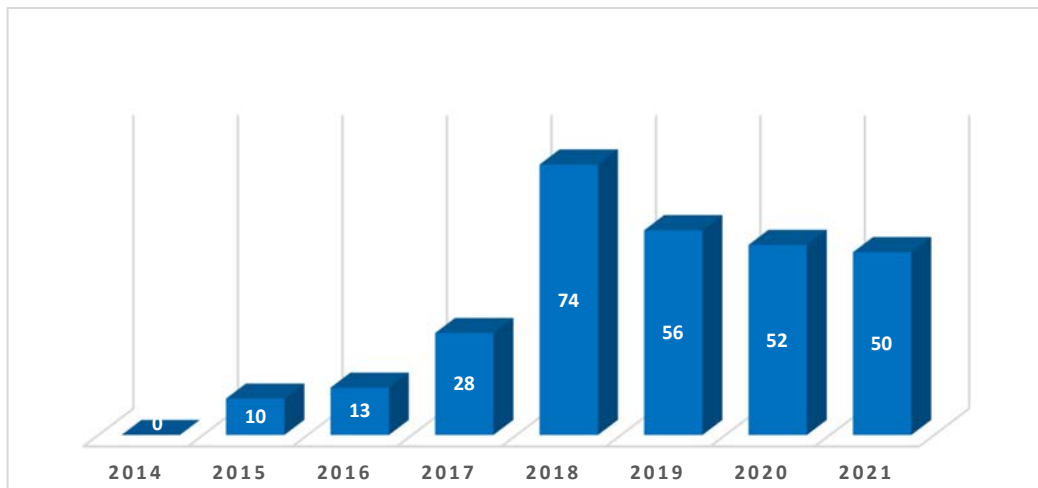


Figure 7. Evolution of the average number of employees in the period 2014-2021

Discussion and conclusions

From the above analysis it appears that, although 2020 was the year in which the Covid pandemic started, for Atlas Sport SRL it was the best year from an economic and financial point of view, recording maximum turnover and profit values. The increase in the values of the indicators analysed is also due to revenues from the health protection equipment supply activity, a newly introduced activity in the company following the opportunities generated by the COVID-19 pandemic. The financial data show a dramatic drop in both turnover and net profit in 2021, but if we take into account the fact that the medical

equipment sales activity has been transferred to Atlas Medical and add up the figures of both companies, the drop in indicators is maintained, but the difference compared to the previous year is much smaller.

Thus, we can conclude that the opportunities generated by the pandemic period were beneficial for the company and the management team that knew how to take advantage of them, and that the changes during the pandemic became definitive in the post-pandemic reality. Atlas Medical continues to supply medical equipment with a development strategy based on the opportunities of the external environment and on the fact that the medical infrastructure in Romania needs development and modernisation.

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THE IMPACT OF THE PANDEMIC ON THE CONSUMPTION OF NUTRITIONAL SUPPLEMENTS

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Abstract

Purpose – *The pandemic has influenced and brought major changes in the medical/nutritional system.*

Methodology/approach – *Documentary study on nutritional supplement consumption before and during the pandemic, case study on dietary supplement consumption during the pandemic, case study at a company distributing dietary supplements.*

Findings – *The paper is focused on economic and managerial analysis during the pandemic period, and the dietary supplement industry and distribution has shown rapid adaptation to the new conditions offered by the pandemic.*

Research limitations/implications – *The pandemic period produced changes that were also reflected in the behaviour of consumers of dietary supplements.*

Practical implications – *The paper provides a centralised picture of the trend in dietary supplement consumption during the pandemic period.*

Originality/value – *The paper identifies the trend of nutritional supplement consumption during the pandemic period.*

Key words: *nutritional supplements, determinants in the classification of nutritional supplements, distribution and marketing of nutritional supplements, customer behaviour during the pandemic period.*

Introduction

Socrates argued "there is one good, knowledge, and one evil, ignorance". (Phyllis, A. Balch, 2020) These words would do well to accompany us in all our actions, especially in relation to our health. So many of us lack information about how to maintain or improve our health. It would be good to be aware that nature has given us an inner healing force (the immune system) and natural substances suitable for the proper functioning of the human body; but unfortunately, there is the possibility of nutritional imbalances that can lead to health problems.

The foods we eat contain nutrients made up of vitamins, minerals, enzymes, amino acids, carbohydrates and fats. It is these nutrients that sustain life, providing us with the basic building blocks our bodies need to perform their daily functions for health. Nutrients are involved in all body processes, from fighting infection, to tissue repair, to thinking. Although nutrients have different functions, the common point is to keep the human body functioning well. A deficiency of these nutrients will cause malfunctioning of some organs or body systems. In order to prevent this, we need a proper diet and appropriate nutritional supplements.

The foundation of good health is a balanced and quality diet supported by supplements. Nutritional supplements are those food products that are used to supplement people's daily diet, they are those concentrated sources of nutrients or other substances with a nutritional effect, which can be marketed separately or in combination.

Nutritional supplements are intended solely for the purpose of having positive effects on various functions of the body for prophylactic purposes. They contain one or more characteristic substances

also called nutrients or active ingredients or substances, which could be vitamins, minerals, amino acids, enzymes, plant extracts.

Nutritional supplements can be classified according to their composition or the functions they perform:

1. Nutritional supplements can be classified on the basis of the essential nutrients contained in: micronutrients (vitamins, minerals), macronutrients (amino acids, proteins, lipids, fibre), phytonutrients (phytochemicals from plants) and combinations of these listed nutrients.
2. Nutritional supplements can be classified on the basis of their therapeutic areas of action into dietary supplements with antioxidant power, anti-ageing, arthritis, rheumatism, cardio-vascular system, diabetes, deworming, dermatological disorders, detoxification, endocrinology, gastrointestinal system, genitourinary system, hydration, immune system, renal system, nervous system, nutrition, osteoporosis, ophthalmology, metabolic regulation and weight control, sports nutrition and muscle tissue rebuilding, skin, hair and nail care.
3. Nutritional supplements can be classified based on consumer/user groups into nutritional supplements for: adults, men, women (pregnant or breastfeeding women, menopausal women), children, adolescents, sports, vegans or vegetarians, people with disabilities. (Phyllis, A. Balch, 2020)

Nutritional supplements can be marketed through the following institutions: pharmacies, drugstores, drugstores and warehouses of supplement manufacturers and importers. Their purchase can be made by direct, physical purchase from these institutions or through the online environment, when the purchase is made using the websites of these institutions.

Consumers, primary care providers, health insurers and employers increasingly recognise the value of preventive health and wellness. Nutritional supplements are cost-effective in supporting overall health and well-being of the human body.

Between 2019 and 2021, the overall DSX score increased nationally in every category, but growth was led by supplements for sleep, immunity, and brain health. During the global pandemic, consumers initially focused on immunity to help themselves stay healthy during COVID-19. But as more options emerged in 2021, consumer interest shifted to brain and sleep supplements to manage stress from the pandemic, while immunity supplements declined slightly. Those most affected by these were active adults, especially those in urban areas. ("Dietary Supplements Index | Consumer Healthcare Products Association")

Annual consumer surveys show that the use of nutritional supplements is more prevalent in the United States when occasional and seasonal use are considered in addition to regular use. Most nutritional supplement users consume a multivitamin, but there are many who take a combination of products. The main reasons given for using supplements are for general health and well-being of the body or to fill nutrient gaps. Nutritional supplement users are more likely to adopt a variety of healthy habits, indicating that supplement use is part of an overall approach to healthy living. ("Consumer Usage and Reasons for Using Dietary Supplements: Report of a Series of Surveys - PubMed")

The US has emerged as a top market for nutritional supplements due to consumer affordability and dominated this market, accounting for the largest revenue share of 34.8% in 2021. The global nutritional supplements market size was valued at USD 151.9 billion in 2021 and is expected to expand at a CAGR of 8.9% from 2022 to 2030.

Vitamins, minerals and immune-boosting herbs witnessed an increase in demand in 2020. Vitamin as an ingredient dominated the nutritional supplement market and accounted for more than 30.8% of revenue share in 2021, due to high demand from active professionals and athletes for energy management.

Tablets segment led the nutritional supplements market and accounted for 33.6% of revenue share in 2021. Higher prevalence of multivitamin products in tablet form due to easy dosing, ease of administration, low cost, longer shelf life is expected to ensure a positive impact.

The adult segment dominated the market and accounted for the highest revenue share of 46.6% in 2021. Changing lifestyles and hectic work schedules among active adults lead to nutritional deficiencies which are expected to lead to increased consumption of nutritional supplements.

Increasing number of geriatric populations in regions such as North America, Europe, and Asia Pacific is expected to augment the market growth over the forecast period. As geriatric population is susceptible to more infections, the demand for immune support from these pandemic users is expected to grow at a higher rate.

The offline segment dominated the market and accounted for the highest revenue share of 81.0% in 2021. The offline subcategories include supermarket/hypermarkets, pharmacies, convenience stores, specialty stores. Supermarkets/hypermarkets contribute significantly to the sales of dietary supplements in Europe and North America due to higher prevalence. In the offline segment, supermarkets and hypermarkets accounted for 33.9% of total dietary supplement sales in 2021.

Sales of nutritional supplements through online distribution channels are expected to register the highest growth in the coming years. People's fast-paced lifestyles, increased number of internet users, easy access to a range of brands, 24/7 product availability, convenience of shopping and a wide range of products on offer are factors driving sales of nutritional supplements through online distribution channels. Sales of nutritional supplements through online distribution channels are expected to register the highest growth in the coming years. The spread of COVID-19 has attracted many customers to e-commerce platforms, leading to easy availability of different brands of supplements to consumers. ("Dietary Supplements Market Size Report, 2022-2030")

North America is expected to be the largest market during the forecast period. This is attributed to the widespread consumption of nutritional supplements in the US and Canada. The Asia-Pacific nutritional supplements market is expected to register the highest growth over the forecast period. This is attributed to the rising popularity of functional and fortified foods in the region. The global market is growing rapidly in South Asian countries such as Vietnam due to the increased consumption of multivitamins and minerals. The growing geriatric population in the region is also a major factor driving market growth. ("Dietary Supplements Market Share, Size, Forecast:2026 | MarketsandMarkets")

Research methodology used in this paper

The survey of the statistical study was carried out on a group of 270 people from 18 counties of Romania, more precisely the interviewees are from Brasov, Galati, Braila, Mures, Sibiu, Covasna, Harghita, Bucharest, Ilfov, Dolj, Timis, Cluj, Prahova, Buzau, Iasi, Vaslui, Neamt, Suceava counties.

The objective of this survey was to discover the impact of the pandemic on the consumption of nutritional supplements for the population in our country, as well as to raise awareness of the contribution of dietary supplements to maintain health.

The number of items in the questionnaire is 10. The data collection and processing was carried out using Google Forms software for the whole group.

Interpretation of results

Regarding question 1: Did you consume nutritional supplements before the pandemic?

62.1% answered positively and 37.9% answered negatively.

On question 2: Did you consume more nutritional supplements during the pandemic?

57.8% answered positively and 42.2% answered negatively

On question 3: Do you currently consume more nutritional supplements than you did during the pandemic?

22.4% answered positively and 77.6% answered negatively.

On question 4: Have you used nutritional supplements for a specific condition?

47.6% answered positively and 52.4% answered negatively.

On question 5: Did you use nutritional supplements to improve the functioning of your immune system during the pandemic?

68.4% answered positively and 31.6% answered negatively.

On question 6: Did the pandemic make you more concerned about improving your health?

66.3% answered positively and 33.7% answered negatively

On question 7: Are you willing to continue taking food supplements?

71.3% answered positively and 28.7% answered negatively

On question 8: Do you document nutritional supplements through specialist advisors/doctors/pharmacists?

59.9% answered positively and 40.1% answered negatively

Concerning question 9: Do you inform yourself about nutritional supplements from information/promotional/internet material?

70.4% answered positively and 29.6% answered negatively

Concerning question 10: You do not do any research.

24.5% answered positively and 75.5% answered negatively.

Conclusions: It appears that before the pandemic there was a significant consumption of nutritional supplements (62.1%), but during the pandemic the consumption of nutritional supplements increased (57.8%), and people are still consuming dietary supplements because the pandemic has not ended, and others are consuming even more nutritional supplements at this time (22.4%).

Consumers of nutritional supplements also use them for preventive purposes (52.4%), but mainly for the proper functioning of the immune system (68.4%), and the pandemic has made them aware of the importance of health (66.3%) and people are willing to continue consuming nutritional supplements (71.3%).

A significant proportion seek expert advice on nutritional supplements (59.9%), and thanks to the information age we are in, a large percentage also research themselves (70.4%), but not least it is encouraging that a very high percentage of people are willing to continue to learn about nutritional supplements (75.5%).

In conclusion, the consumption of nutritional supplements has increased during the pandemic period and people want to continue consuming nutritional supplements because they are aware of the importance of prevention and are eager to accumulate new information about nutritional supplements.

The case study on the possible changes perceived by a consultant in the consumption of supplements was carried out at the company CC specializing in such products, which started its activity in 1998 in Canada, and for over 20 years, has been helping people around the world to improve their lifestyle with the help of unique products of very high quality.

The company has sales offices in 39 countries, distributing in 189 countries, the company's portfolio contains more than 200 health and beauty products, and production is carried out in 10 countries worldwide. These factories use innovative technologies in the production process, raw materials from natural sources, resulting in products in a balanced and bioavailable form. The company's main priorities are product quality, safety and attractiveness, quickly bringing to market innovative solutions to support health and beauty. ("Despre Companie")

The company's communication with customers has been carried out through the company's advisors who support customers with information and details about the products, but during the pandemic period the communication strategy has expanded to the online environment: webinars, presentations, seminars, conferences, inviting specialists in the medical/nutritional field who have held educational webinars on general information about a healthy lifestyle.

The study in CC was conducted on a company advisor in the ante, pandemic and present period. Quantification of sales was done in points, which represent the value of sales in lei, each product being assigned a certain number of points according to its value in lei.

Before the start of the pandemic, in January 2020 I had a turnover of sales representing 1750 points, when the pandemic started in March I had a turnover of 2500 points, and these sales increased in May 2020 to 4000 points, so that in October 2020 I had a turnover of 6500 points which at the end of the pandemic year 2020 in December became 8000 points. Summing up, in 2020 the turnover increased 4.5 times and we had 120 new people consuming dietary supplements in 2020.

The year 2021 continued its upward trend in this nutritional supplements market both in terms of turnover and in terms of new people joining who consumed monthly supplements. In the months of March and April 2021 we had the highest turnover of 15,500 points, and in the other months of 2021 the turnover averaged 10,000 points, and the number of new people who became regular consumers of nutritional supplements increased by 161 people in 2021.

In 2022 the volume turnover of supplement remained at 12,000 points, with only a slight increase, and the number of new consumers increased by 26 people until June.

It emerges that the highest receptivity of the population to the nutritional supplements segment was in the peak pandemic period, i.e. March 2019 - December 2021 when the volume of sales increased, but also the number of new consumers.

Final conclusions: the SARS COV19 pandemic has impacted various areas of business globally, but more importantly has brought major changes to the healthcare/nutrition system.

From the two studies, statistical and case studies, it appears that during the pandemic the consumption of nutritional supplements increased and the population paid more attention to the well-being of the body, focusing on prevention and health improvement. This has been achieved by taking necessary and beneficial nutritional supplements to support the immune system, manage stress, remove fatigue and restore the circadian rhythm in order to gain energy and overall well-being.

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PANDEMIC CHALLENGES AND POST-PANDEMIC APPROACHES IN ROMANIAN SMART COMMUNITIES

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Abstract

Purpose – The paper aims to investigate the COVID-19 effects on innovation in urban management and (e)Governance.

Methodology/approach - As an approach, the primary qualitative observation method was used, combined with the literature review.

Findings – Crisis boosts innovation and creativity. As Smart Cities are a developing process in Romania and eGovernance was mostly at its beginning, the COVID-19 crisis expedited processes and helped burn stages in relevant domains. Local communities found ways to cope with the new reality. The crisis passed, vectors of modernization and innovation face opposing forces of resistance to change that were silenced during the pandemic.

Research limitations/implications – n/a.

Practical implications – Good practice examples where innovation and creativity shaped communities and support sustainable development, inspiring future generations.

Originality/value – Following the good practice examples of C, BM and B communities in Romania.

Key words: resilient communities, smart cities, innovation.

Introduction

"The concept [smart city] is an organic connection between technological, human and institutional components" (Nam and Pardo 2011).

"Smart cities - are like organisms that develop an artificial nervous system, which allows them to behave in an intelligent and coordinated way. The new intelligence of cities is then found in the effective combination of digital telecommunications networks (nerves), ubiquitous intelligence (brains), sensors and hinges (sensory organs) and software solutions (knowledge and cognitive competence)" (Chourabi, et al. 2012).

"Smart city is a concept in which citizens, objects, utilities, etc., connect in an easy way using ubiquitous technologies, to significantly improve the quality of life in urban environments of the 21st century" (R. P.-S. Dameri 2014).

"Smart City refers to a city where ICT strengthens freedom of expression and accessibility of information and public services" (Anthopoulos 2011)

The article proposes to follow pandemic-post pandemic experiments in the cities of B, C and BM, in the context of digitalization, EU funding and social innovation, as cyber-physical boundaries disappear (Tushar and Faiz 2022).

Pandemic effects on Smart City initiatives in Romania

Cities across Europe, and especially Romania are heterogeneous entities. Development or lack of development is not ubiquitous. Diverse communities are created within cities, on criteria such as neighborhood, social status, age, occupation, hobbies, or even political principles. The diversity raises

challenges that cannot be tackled on a city scale, while solutions often work for certain groups only (Pop, Lobonțiu and Lobonțiu 2019).

Resilience against disasters in Romania is ensured at a national and local level by authorities such as the General Inspectorate for Emergency Situations, as well as municipalities and volunteer groups. (Pop, Lobonțiu and Lobonțiu 2019).

Romania's first smart cities initiatives began in 2005-2006, in Oradea, with integrated eGovernance systems, replicated in the coming years in Baia Mare or Ciugud. However, the advancement of Smart City technologies was limited, and even partly blocked during the 2008-2009 financial and economic crisis, only for the concept to be re-discovered in late 2016. Cities like Cluj-Napoca or Alba Iulia began a swift process of digital transformation, leveraging opportunities like EU funding for the first and the highly developed local ICT industry for the later. A hype started across Romania, having the National Electronic Payment System (ghiseul.ro) and the four very different good practice examples in Oradea, Cluj-Napoca, Alba Iulia and small village of Ciugud. As many municipalities started following the innovation leaders, the COVID-19 expedited steps towards digitalization, mostly towards Smart People (digital education and literacy) as well as Smart Governance (digital public services).

Most municipalities were forced to innovate, as to reduce direct human interaction, while having limited technical, financial, and legal support from the National Authorities. Some cities (successful ones) teamed-up with solution providers to deliver easy to use platforms for citizen interaction and digital public service, while others opted for "traditional" approaches such as email.

Service providers were, at turn, forced to adapt and innovate, as teams left offices for home in a new, uncharted territory of remote work. Workflows, timetables changed, and the integration of beginners seemed, at first, impossible. Employees lingered for interaction and online meetings seemed a poor replacement for the traditional standard.

Two years after the pandemic outburst, the „Uberization” of work transformed the workplace forever. Innovation teams tend to refuse returning to „the office”, often threatening to quit their jobs if a mandatory return was put in place.

These digital interaction habits created expectations not only towards the workplace, but also administrative authorities, where citizens expect and demand digital service. This has given a boost to digitalization but is forcing city innovators to find new methods for community binding in a digital, post-pandemic era.

A major bottleneck in fulfilling citizen expectations is bureaucracy, often enforced by legislation, as well as Romanian's authorities to create digital bureaucracy (or digitizing bureaucracy) rather than performing digital transformation processes. Although the Pandemic forced digitalization and Government ordinances made it mandatory for public authorities to accept electronic document transfers and online requests, most bureaucratic processes remained unchanged.

The government failed implementing (at least in part) the Once Only Principle in terms of data and documents owned or produced by public authorities. "The 'once-only' principle (OOP) is a crucial element in the delivery of the user-friendly digital public services and modernization of public administration. Providing the same data repeatedly is troublesome and time-consuming both for citizens and businesses. It is also not reasonable since most of the data is already stored in authoritative sources. The key is to enable public administration to retrieve it in an efficient and safe way" (Marmot et al, 2021).

The absence of constraints towards data owners, mainly central authorities as well as the inexistence of identity verification, certification and management systems forced local authorities to create their own identity management systems, as well as to digitalize bureaucracy. Consequently, all physical dossiers (including copies of ID documents, certificates or attestations) were moved to the digital space (often scanned and emailed).

A special approach targeted social aids management, where the legislation specifically describes the *physical dossiers, including signed, stamped and certified copies of documents*. Thereby, on one hand, legislation forces cities to own physical documents, on the other it forces them to accept online interactions, on the other hand, public servants are forced to verify and create physical dossiers.

Several cities were already implementing digitalization processes, often funded through Administrative Capacity Operational Program. Some managed to include new functionalities, and even innovate in some respects. Leveraging on the funding available and pandemic regulations, many Romanian cities digitized their interaction with citizens, including tax payment, tax declarations, urban planning certificates and even construction authorizations. Some cities even started to innovate in social aids management, where legislation regarding dossiers was most "digital-resistant". A first Step taken by the city of BM and A was to accept online documentations, verify them, request clarification or additional documents where needed and then, on an agreed schedule, invite citizens to deliver the physical dossiers. Several advantages were quickly identified for this method. First, the amount of time people has spent in queues decreased, and the return rate for missing or unacceptable documents was significantly reduced. Second, the public servants were able to better manage their work-time. Third, and most important, this process opened the path towards online / printed dossiers out of the online system as well as digitally archived dossiers.

The digital transformation of public services created another need – that of validation of online documents and fraud prevention. At a local level, this facilitated (or forced) systems' integration. Although theoretically presented and "desired" in the past years, the implementation of the "once only principle" was never a priority, as technical (or financial costs regarding technical aspects), logistic and regulatory barriers were showstoppers.

At a local level, authorities began to understand that systems' integration is a sine qua non prerequisite for delivering secure, decent and ubiquitous online public services. Cross-department validations are feasible in all 3 cities of the study, as integration services are available providing information about social aids, property, tax payment or the agricultural register.

The city of BM and C have requested integration with national systems, including identity management, but central authorities refused interoperability.

However, good practice examples at a local level managed to inspire central authorities and a process of creating specific legislation was put in place, forcing central authorities too cooperate and create digital services that any public authority can use depending on its specific needs and activity.

A special case of innovation was the city of C, whose mayor has made it his mission to have Romania's first paperless and cashless city hall. Though his efforts have started in the early 2000, the pandemic gave him further silver bullets against the bureaucracy monster. Though the city provided several online tax payment methods (bank transfers, local card payment solution and integration in Romania's National Electronic Payment System – www.ghiseul.ro), the elderly preferred cash payments, creating queues at the cashier's office. Forced by the pandemic to reduce human interaction, the city decided to use a machine for cash tax payment. Due to supply chain issues and high demand for that type of machinery, the only available option was one that could not provide change, thereby people being forced to have the exact amount. This was highly frustrating for the local community, as, in theory, they had to visit the city hall twice: once to find out their due tax amounts and a second to bring exact change. The machine implementation was doubled by a dismissal of cashier payments. The city's solution to the issue was having the cashier exchange money, but not accept payments, if a machine was unable to provide change. As soon as a machine providing change was available, it replaced the old one. But innovation did not stop there. The city consists of several villages, and mobility for tax payment needed to be reduced. A cooperation agreement was created with local shops in each village and similar machinery for tax payment were placed in the local stores, so people could use them when shopping. Furthermore, if people were going to pay their taxes, they also made purchases from the local stores, thereby leading to a win-win situation.

Further innovation in the city of B – after implementing an online portal and mobile app for eGovernment, that included local issues reporting tools, the city was disappointed by a relatively small, recurring and counter-productive citizen-interaction regarding city problems. Thereby, it acknowledged that a city-reporting tool tends to reduce morale, both for citizens, the administration and, in the end, a worsened cooperation between the two. This was caused by an unrealistic citizens expectation that a pothole or broken bench should and could be fixed as soon as it is reported. The city needed to create a positive context for its reporting app. An innovative idea came to place, respectively a contest for the city's most beautiful garden and balcony. The app was enriched by a voting functionality, and mixed positive content with city problems, sweetening the entire context.

A third example is the city of BM, which, from its desire to improve its image and citizen participation, decided to implement participatory budgeting. Characterized by a huge lack of trust between citizens and the local administration, the city failed the process, with a small number of participants and an even smaller number of valuable projects. However, the city understood the need for digitalization, sustainability and a better understanding of the community's needs and expectations. It decided to create a Smart City Strategy. Involving some of the country's best consultants on smart cities, it created a participatory framework designed to identify local innovators, innovation projects and local companies that could support and co-create the BM Smart City. Using on-line campaigns, the consultants attempted to reach a wide group of stakeholders. The public consultation process was supposed to be different from anything that was ever done in a strategic context in the country, respectively leverage on technology and digital asynchronous interaction, rather than private stakeholder meetings. Social Media leading to questionnaires were presented on over 60.000 screens and impacted (was read by) at least 23.000 people, and over 5000 post interactions were registered. Despite the impressive numbers (for a 120.000 inhabitants city), under 100 (mostly negative or unrelated) comments were registered and less than 10 questionnaires were filled (despite their simplicity, ergonomics and small number of questions). Confronted with the refugee wave caused by the Ukrainian war, the same local community organized on Facebook groups to provide shelter, food and support for the refugees, becoming an international good practice example.

Thus counter-intuitive, smaller communities have better Smart City and eGovernance tools adoption rates.

Conclusions

The pandemic changed forever the way in which people expect to interact with authorities. Despite the creation of tools for eGovernance, two major (and opposing) trends were identified. Communities already used to participatory processes and co-creation have become even more inclusive and collaborative, breaking boundaries and speeding up the digital transformation process, while digital resistant communities have, at most, digitalized bureaucracy.

Often using the same technical tools (so not needing to consider and analyze users' digital literacy, ergonomics of the software or other technical aspects), similar communities found themselves obtaining different results in terms of adoption.

Although digitalization appears as an impersonal process, digital transformation tends to create its own bottlenecks and boundaries, often similar or derived from the physical interaction processes, such as mistrust, lack of involvement, bureaucracy, poor legal frameworks or a general negative attitude towards change.

Communities striving at becoming smarter (in the context of smart cities), resilient (in face of crisis, pandemics, natural disasters or war) or more sustainable (in terms of climate-change resilience and mitigation, sustainable resource usage, etc.) need to build trust between local stakeholders. As shown by the Cluj Innovation Camps taking place in the past 5 years (European Commission, 2017), (Transilvania IT, 2020), in order to achieve the Smart City Status, a city needs to take a step back and become a facilitator, rather than a driver. It needs to team up with local organizations, innovators and create a framework for them to educate, evolve and create an ecosystem of cross-domain, politics free digital transformers.

The pandemic and post-pandemic context have transformed citizen expectations in terms of public service delivery. However, the (apparently) inherent reverse effect of increasing participation and citizen involvement through digital channels did not happen in communities where co-creation was not already in place before the pandemic.

Although Romania's Digital Economy and Society Index (DESI) is Europe's lowest, this is not mostly due to a lack of digital services or digital literacy, but rather a result of the citizens' lack of involvement, participation, trust, and desire for a true digital transformation (possibly even fear or resistance to change).

Smart Communities development needs to base itself on the relevant pillars of Smart Cities, and support the parallel development of Smart Economies, Smart People, Smart Environment, Smart Mobility, Smart

Living and Smart Governance, as the extensive development of one component ignoring the others causes more discrepancies and smaller adoption rates, generating negative contexts.

Further research needed

Digital transformation processes towards smart city implementations and the progress of Romania's existing Smart(er) City initiatives should be studied from a citizen's participatory point of view.

The existing Smart City tools implemented by municipalities need to be revised and their impact on the local quality of life needs to be assessed thoroughly.

It is also important to assess why existing tools provide different results in different communities, and an extensive assessment of uptake barriers is recommended.

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COMPARATIVE ANALYSIS OF MODERN ORGANIZATIONAL FRAMEWORKS FOR BUSINESS PROCESS MANAGEMENT TO BE IMPLEMENTED IN THE POST-PANDEMIC REALITY

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Abstract

Purpose – The main research purpose was to understand the context in which innovation was adopted at the organizational level and what frameworks were encouraging transformation in the post-pandemic era. Because of new organization structures development, a new genre of organizational approach and the need of new professionals appeared to support these practices.

Methodology/approach – The approach for this research considered analyzing the two guides BABOK and BPM CBOK, identifying a common ground, modelling the main process, organizational frameworks and debating the differences using comparison analysis, having as a starting point core concepts common for both guides. Main methods used: comparison matrix, indicators as scope, common/different processes, performance indicators.

Findings – The findings captured the main similarities and differences among the modern organizational frameworks for business process management considering the criteria of analysis such as aim, structure, concepts, methodology for implementation, process components, etc.

Research limitations/implications – The research limitations provided by the analysis itself was aiming to analyze and compare strictly the two guides considering main common concepts and structure.

Practical implications – The current study could have practical implications and be used as a starting point for a in detail analysis regarding the way of framing business processes and introducing a change culture into the organization, also considered as the value of this paper.

Key words: Business process, organizational transformation, modern organizational frameworks

Introduction

In the past two years organizations faced many changes during an unprecedented pandemic, no matter the industry, the business processes had to be configured once again to the fast-changing environment. Analyzing and comparing two modern organizational business process frameworks, seeing how they are implemented nowadays, might bring solutions to prevent a high impact and more flexible solutions in case of calamity.

This paper can be considered theoretical research, exploring the comparison between two business organization process modelling frameworks: BABOK (Guide to the Business Analysis Body of Knowledge) and BPM CBOK (Guide to the Business Process Management Body of Knowledge), emphasizing the organization structure transformation needed in the post-pandemic reality.

Business process management represents a mix between management knowledge, a set of techniques and digital tools supporting managing by process. These frameworks developed by research entities as International Institute of Business Analysis (IIBA) and Association of Business Process Management Professionals (ABPMP) had been stressing on the need of organizations to become flexible, adaptable and able to redesign existing business processes. Hence the organizations should find ways to adapt and transform their structure at the same time, keeping the pace with the technological advancements and the post-pandemic reality.

Both guides have editions on the market since the 2000s, reviewed constantly from time to time. Because of the issues tackled in the literature review, and the stage at which the pandemic arrived, the frameworks discussed are fresh and up to date with the times lived. The organizational modelling matches the need of flexibility and changes required during and after the COVID-19 pandemic. Both frameworks are including the introduction and knowledge about purpose and structure, main key concepts and definitions related to the subject for a better implementation understanding.

The BPM CBOK is covering main points related to business processes, from modelling, analysis, design, performance, transformation, and organization followed by enterprise process management and BPM technology. On the other hand, BABOK is presenting the aspects related to planning and monitoring, collaboration, lifecycle management, strategy analysis, design requirements, solution evaluation, competencies, and techniques.

There can be identified a middle ground for both guides, and that are the organizational approach or modelling and the idea of business transformation with the help of the business processes. In the case of any organization, processes evolve continuously if the business succeeds on the market. Then the process transformation represents the fundamental rethinking of that organizational structure, and more over the goal is innovation (the approaches, techniques and technologies enhancing the transformation). On the other hand, the business analysis core concept model guideline has been described under six core concepts (change, need, solution, stakeholder, value and context) regardless of the perspective, industry, way of application or level in the organization. Change represents the transformation of the business/process/product in response to a need. And then finding solution for that specific need. Hence this transformation also works to improve the performance of an organization. In this case in what degree is transformation considered innovative and becomes innovation for organizations having different structures?

Further on, some common concepts were identified and defined from the perspective of each guide and the first comparison was made. These concepts were business analysis, input and output of the process/project/organization, the stakeholders, the context and the idea of change and transformation related to the innovation side. Each one being a fundamental practice and part of the business processes and structure, as seen in Table 1.

Table 1 - Common concept comparison

Concept	BABOK	BPM CBOK
Business analysis	Defining needs and designing and describing solutions, within the boundaries of a project or throughout enterprise evolution.	Tool used by the analyst to understand the business environment and its changes, for discerning how processes might need to adapt.
Input	The needs met and the performance objectives set to be achieved.	Resources or data triggering the process components
Output	Stakeholder engagement, information management approach, methodologies and frameworks.	Services, products meeting or exceeding the stakeholders and the customers' expectations.
Stakeholder	A group or an individual acting for the organization's sake, through motivation, interest and change.	A group or an individual who could impact and be impacted by process / project / organizations' outcomes.
Context	The total components of an environment influencing and influenced by the change.	The total components of the business and process delivery achieving the organizations goals.
Change	Improving the performance of an enterprise using the addressed problems and opportunities.	The rethinking of a process and bringing improvement and performance to the organization.
Transformation	The data migration and molding the information into the processes.	A better way to do the work of the process through frameworks, tools, and equipment.

Methodology

This paper was using as literature review the BABOK and BPM CBOK guides, framing the analysis over following characteristics: scope, structure for implementing the guides, emphasizing the business processes, the process components and the need of business transformation in the post-pandemic era. Comparison tables were developed in order to show the common points and the differences between the frameworks.

Findings

The pressure for excellence and innovation, nowadays, had emphasized the role of process development for improving organizational knowledge and work through process-based approach. The pandemic environment forced organizations to reconfigure strategies, activities and governance.

Given the process management approach the organization could secure its operation processes on a constant basis, delivering the promised value to its customers and stakeholders. By designing end-to-end processes, aligning internal processes with strategies, defining proper governance and measurement systems, the organizations will be able to operate with lower costs, improved accuracy and high level of customer satisfaction.

Even if there is a substantial body of knowledge and an increasing interest on process-oriented approach, the challenges remain since applications without a solid theoretical foundation is extremely hazardous, especially when organizations adopt changes as a way of surviving this turbulent world. Thus, understanding main characteristics of processes and comparing different approaches of organizational structures may give a clear perspective of modern organizational frameworks.

Business process management frameworks

The scope of both guides is to provide sets of common accepted practices in their area of expertise. BABOK is offering a framework for defining and creating a profession as business analyst and BPM CBOK requires the fundamental knowledge for a BPM professional.

In the case of each one of the frameworks the structure is related to the knowledge areas covered, as seen in Table 2. Beyond the knowledge areas the structure of BABOK goes through Competencies, Techniques (similar with BPM Technologies) and Perspectives.

Table 2 - Knowledge areas

Knowledge areas	
BABOK	BPM CBOK
Business Analysis Planning and Monitoring	Enterprise Process Management (Enterprise perspective - EP)
Elicitation and Collaboration	Process Organization (EP)
Requirements Life Cycle Management	Process Modelling (Process Perspective – PP)
Strategy Analysis	Process Analysis (PP)
Requirements Analysis and Design Definition	Process Design (PP)
Solution Evaluation	Process Implementation (PP)
Competencies	Process Performance management (PP)
Techniques	Process Performance transformation (PP)
Perspectives	BPM Technologies (PP)

Were considered the following business process components by the BABOK framework: task, input, output, activity, and by BMP CBOK framework: subprocess, workflow, process roadmap. Both BABOK and BMP CBOK covered main understanding of the process components, as seen in Table 3.

Table 3 - Business process components

Process component	Characteristics
Task	A piece of work Performed formally or informally
Subprocess	Set of activities defining just a part of a process
Input	Resources used to start a process/subprocess/task
Output	Result produced by performing a task
Activity	An activity split into tasks
Workflow	Sequence of activities/processes including the aggregated information that has to be integrated with other business units
Process roadmap	Set of activities integrated across the process areas Following the inputs through the outputs into the result

To facilitate an organizational modelling for a modern organization, the main activities would be designing – definition of the future state of the organization/process/project; modelling – graphical representation of the organization structure and processes, shaping requirements and solution design specifications; execution and monitoring – iterating the process flow and finding alternatives for design improvement; optimizing – iteration of the previous phases.

Another important point considered was the proper governance. The business process is about creating rules and standards for the organization, identifying decision markers, the risk management and resource management plans, and the prioritization strategy.

Measuring performance is essential to know if the processes are efficient, being part of the value chain. The performance can be checked by the objective's completion, by the governance strategy and by the overall stakeholders.

Organizational structure modelling

Any group coming together fulfilling the same scope using a similar set of skills and targeting the same market represents a unit which can be organized following a pattern. The models are inspired from the observed human behavior. This way, familiar patterns are used to improve the experience at work and in the same time imposing some rules and governance strategies.

The organizational structure or the organizational modelling are expressions used by both guides to express the visual representation of an organization. These representations are showing how roles and functions are spread in the organization and how the processes are assembled to support the execution.

A visual representation of the organizational structure usually is consisting of group managers, functional roles and formal relationships between the employees, interaction and dependencies of the unit with the stakeholders. Nowadays, a cross functional approach of managing business processes is used, hence specialized roles have to support the governance, the decision makers.

BABOK is classifying the types of organizational models by three main characteristics: functionally oriented, market oriented, and the matrix model. These three modern structures are usually depicting the organizational unit, roles and people and lines of reporting.

As BMP CBOK is more process oriented, the organizational models are shaped and labeled by the importance of leading roles and responsibilities for business process management. The leading role that may influence the organizational structure is the process owner, where a process owner represents a person or a group having this role for a complete end-to-end business process.

The responsibility for a business management process is assigned to the process owner, hence he is responsible for ensuring that the process meets the expected results. The organizational structure in this case can be split into two approaches: functionally aligned process ownership and non-functionally aligned ownership.

In the case of functionally aligned process ownership, process owners report to heads of functional units, either a single process owner is assigned for the whole unit, or the responsibility for process ownership is assigned to multiple process owners, basically being inside the unit structure. For the case of non-functionally aligned ownership approach, process owners report directly to the head of the organization, with the possibility to have a different branch managing the main business processes and providing business analysts, governors and leaders to projects from different units.

Business transformation

“In most cases, organizations have evolved in response to business needs.” (Moore, C., Saxena, R., Lee, D., & Powell, E, 2013, p.288) The structure is affected if the needs, the market and the objectives change. Nowadays, the technological advancements are happening very fast from many reasons, and organizations must have a continuous improvement and a multi-dimensional view, despite the human fear of change, or appearance of a new pandemic situation. This improvement is bringing a shift into the organizational culture transforming traditional organizations into learning organizations, always learning to improve processes and capabilities, to train human resources and adapt to the ongoing technology development and environment challenges.

The alignment of human resources – operations (processes) - technology is very important. Although in transformation all three previous mentioned actors are essential, most of the time the transformation starts from the business process and from the organizational structure. Being a departure from the companies past governance and way of thinking, often unconformable for the employees and managers.

Flexible organizational frameworks must nurture the collaborative working environment, compromising and yet producing an optimal solution, encouraging the acquisition and use of cross-cultural skills and the ability to iterate. Nowadays, business transformation, fosters emerging technologies and BPM methods.

According to Eurostat (2014), a total of 46 903 of enterprises in the EEA (European Economic Area), at that time 31 countries, had introduced new business practices for organizing procedures, new methods of organizing external relations, and new methods of organizing work responsibilities and decision making. Although, Germany had the highest number of enterprises for all three indicators and Malta and Iceland the lowest, the number of enterprises was unbalanced, because some big countries considering the territory and population, did not had a high number of enterprises embracing business transformation, for example Romania, with an average number of 350 enterprises for all three indicators.

However, these decisions related to transformation were not enough, they failed to prepare the markets, the industries, the economy for the shock and transformation waves brought by the COVID-19 pandemic.

Few years later, between 2018-2020, according to the National Institute of Statistics, Romania had a total of 702 enterprises using innovative business processes, where 81.9 percent developed their business process innovations in their own enterprise, 25.6 percent developed the innovations together with other enterprises, 12.3 percent implemented their innovations by adapting or modification of processes initially developed in other enterprises, and 5.3 percent had business process innovations developed by other enterprises.

Taking into considerations the behaviors and results for the pre-pandemic period, the impact shows a low number of organizations having flexibility and adaptation implementing frameworks as BABOK and BPM CBOK. Due to lack of studies from the post-pandemic period in-depth, a comparison it could not have been done, however this can be considered a possible direction of research in the next period.

Contributions

The authors made a synthesis and comparison of the research made over the two guides (BABOK and BPM CBOK), getting into detail about the organizational frameworks. Another important aspect was the data filtering and processing.

Conclusion

Considering the complexity of organizational environment, the paper had deciphered modern scientific literature in the attempt to provide understandings of the organizational processes concepts and related management systems. Aligning strategy to processes is made through the organizational structure, in the context of technological advancements and post-pandemic reality.

Both books used for the literature review are covering the need of structuring the visual representation of an organization in a modern approach, BPM CBOK emphasizing the roles of the business process responsible (process owner).

The biggest challenge in today's world to adapt in real time the activity to the technology, the market, and the environment threats. Business transformation brings many positive aspects, helping organizations to identify, prioritize and optimize their business processes to deliver value to the stakeholders.

Business transformation should involve seeking ideas from both inside and outside the organization, and be accepted and implemented by most organizations, considering the pandemic which just withered away, some time ago.

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2020

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CASE STUDY ON THE INFLUENCE OF COVID 19 ON THE MANAGEMENT OF STRUCTURAL AND INVESTMENT FUNDS

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Abstract

Purpose - to analyze the impact of the COVID-19 pandemic on the management process of European projects.

Methodology/approach - bibliographic study method - due to the multitude of information that is constantly exploding, this method is vital to any research study. Observation. Statistical data analysis. The case study method - is a suitable method if a full and in-depth investigation of a topic is desired.

Findings - Improving the management process of European projects. Establishing action strategies in case of a new pandemic.

Research limitations/implications - research limitations are due to the fact that this research was conducted on a limited number of projects.

Practical implications - determining the factors that made it difficult or even suspended the process of carrying out project activities. Implementation of measures through which managers can improve the management process of European projects.

Originality/value - the originality of the paper will be confirmed through the observations, analyzes, case study and conclusions presented in this paper.

Key words: Project management, Structural and Investment Funds, pandemic.

Introduction

As in the case of the other areas, the pandemic caused by the Sars-Cov2 virus has been a real problem both in terms of Structural and Investment Funds, but also in the case of the management process and efficiency of the projects financed by them. The negative effects of the pandemic have emerged since the first months of 2020, manifesting in various ways, such as the inability of employees to carry out the activities of the projects established by the funding applications and funding contracts, and up to the loss of human resources employed in within the projects, but also of the people enrolled in the target group, as a result of the large number of victims produced by the new virus.

In the fight with all these problems, but also with many others, which presented, at that time, an equally high level of gravity, the project managers put the greatest effort. They were in a continuous search for the best solutions in order to mitigate or even avoid the negative effects of the pandemic on the managed projects, but also to resume, as quickly and safely as possible, the activities of the projects and their successful implementation. Each solution found, as well as every decision taken in order to successfully carry out project activities during this period, came, however, with a huge baggage of new responsibilities that the managers had to assume and learn to manage overnight. Certainly, this period was decisive in the process of distinguishing the best managers, because this was precisely the period when each leader demonstrated how well he knows how to manage crisis situations, how effectively he knows how to react in stressful situations, but most importantly, how well he knew how to predict the threats that may arise in the project implementation process and what kind of solutions can be applied, regardless of whether we are talking about the human resources department, technical department or financial department of the project.

Specific aspects of european projects during the COVID 19 pandemic reflected in specialized literature

The Structural and Investment Funds represent one of the main instruments through which the European Union intervenes in the internal politics of the member states and not only. Namely, this is the instrument through which it is aimed, not so much to influence public decisions, but to direct them towards the recovery of the least developed sectors of the states.

Through these so-called invisible weapons:

- ✓ "The European Regional Development Fund (ERDF) - aims to strengthen economic and social cohesion at the regional level by investing in sectors that enhance growth, with a view to generating a higher degree of competitiveness and job creation. At the same time, the ERDF finances cross-border cooperation projects
 - ✓ Cohesion Fund (CF) - invests in people, focusing on improving opportunities in employment and education. It also aims to support disadvantaged people who face the risk of poverty or social exclusion
 - ✓ European Social Fund (ESF) - invests in green growth and sustainable development and improves interconnection in Member States with a GDP below 90%"(The European Commission, 2014)
 - ✓ "European Agricultural Fund for Rural Development (EAFRD) - focuses on solving specific problems faced by rural areas in the EU"(The European Commission, 2015)
 - ✓ European Maritime and Fisheries Fund (FEPAM) – encourages fishermen to adopt sustainable practices and helps communities in coastal areas to diversify their activities for a better livelihood
- wich make up the Structural and Investment Funds, the European Union leads a continuous struggle to promote principles such as social inclusion, environmental protection, non-discrimination, positive competitiveness in business or equal opportunities.

The European Union intervention action through the Structural and Investment Funds is materialized, in the initial phase, by the establishment of intervention programs at the beginning of each financing period, and in the final phase by providing the necessary investments for the implementation of projects whose activities and objectives aim to contribute to the achievement of european objectives. In this context, in my opinion, the projects can be likened to the cells of the human body, which, although they are, mostly, microscopic and innumerable, the death of each one affects the proper functioning of the human body. This also happens when one or more projects, for some reason, are not successfully implemented, thus a stagnation in the development process of the targeted area is observed.

In the pandemic years, this aspect was all the more highlighted, because, precisely during this period, most of the previously started projects encountered a lot of obstacles that made it difficult or even impossible to continue the implementation of the projects. Thus, some projects have not managed to overcome all the difficulties yet, even at the present time, others, however, have ended up being a great success. In this case, the responsibility, both for the failures and for the successes of each individual project, is borne equally by the European community, and by the project managers themselves. This is because, while the European community and the member states do not currently have a guide of good practices that can be applied in the project management process in such periods in order to reduce the negative effects, the project managers, unfortunately, they revealed the lack of experience in making decisions in emergency situations, but also their level of stress resistance.

However, the pandemic has managed to highlight not only the managerial gaps of projects, but primarily the gaps in the entire management processes of today's societies.

Problems caused by the pandemic

Despite the numerous analyzes carried out at the time of drafting the projects' funding applications, the pandemic caused by COVID-19 was not foreseen in any of them. Dozens or maybe even hundreds of SWOT analyzes were done, but unfortunately, in the threat quadrant, non of the managers mentioned a possible pandemic that could turn all our work upside down and keep us locked up in our houses for such a long time. For this reason, just like all of us, project managers were caught by surprise when, overnight, they had to deal with a huge number of problems that started to confront the projects they were managing.

From my point of view, one of the biggest problems faced by the project managers during that period was the obligation to suspend the activities carried out. This problem in turn generated another problem, namely the fact that thousands of employees, including project managers, were left without income from the projects, a factor that further intensified the fear that citizens already had.

Another problem that the project managers faced was that during this time the virus claimed a lot of lives. This factor negatively influenced the projects from two points of view, because, on the one hand, the victims were the experts employed within the projects, and on the other hand, they were people enrolled in the target group.

The project managers who nevertheless managed not to suspend their activity during this period, but also the others, at the time of the resumption of activity, had to comply with several rules, such as:

- Respecting the maximum number of people present in the meetings;
- Ensuring a distance of at least 2 meters between participants;
- Equipping rooms with disinfectant;
- Wearing protective masks;
- Temperature check, etc.

Analyzing the above, we can easily realize that the most affected projects during the pandemic were those related to education. Here we are talking both about the projects that involved carrying out practical activities together with children 0-16 years old, in order to bring and maintain them in educational institutions, as well as the projects that involved training activities for adults.

Solutions for managers

There are several solutions that project managers would be able to accommodate them during the pandemic. The most important, however, in my opinion, is that of digitization. The pandemic managed to demonstrate once again the low level of digitization not only of the state public administration, but also of other public or private institutions. Appropriate endowment and digitization of institutions would allow:

- the continuation of project activities in the online environment;
- holding work sessions in the online environment;
- conducting training courses within the projects in the online environment, etc.

Despite the multiple benefits that technology currently provides, due to a lack of equipment, licenses, or even knowledge related to the manipulation of electronic devices, some managers did not manage, at the time of the installation of the state of emergency, to pass at least part of the project activities in the online environment, others, however, unfortunately, have not been able to do so until now. Thus, in the event of a new pandemic wave and the installation of a new state of emergency, some managers would be as caught by surprise as they were two years ago. Closely related to digitization is the adoption of the electronic signature. Thus, by means of digital signatures, it was possible to reduce the number of physical contacts between project employees, but also between them and other institutions.

Another solution that the project managers could have implemented in this period of crisis is to reduce the number of participants present in the activities. Although this requires a greater effort by managers and experts, and also greater expenses, nevertheless, it is a way that allows the resumption and carrying out of activities, which ultimately allows the successful implementation of the project.

Another solution was to ensure a sufficiently large space for project activities, so that the participants could respect the minimum distance of two meters. There would still be a lot of solutions that the managers of the projects financed from the Social and Investment Funds could have implemented during that period, especially since the European Union itself was not reluctant, intervening immediately by reallocating the funds in order to reduce the negative effects of the pandemic and the fastest possible resolution of the problems caused by it in the various areas of the member states and not only.

Despite the countless failures of European project management due to the pandemic, however, at the end of 2020, the results of the European Union's Structural and Investment Funds recorded up to the end of 2020 looked like this:

- "3 million enterprises supported in the process of continuing the activity;
- 236,500 new jobs created
- 45,000 people supported in the process of social inclusion, employment or participation in education;
- 2 million sustainable projects in the field of agriculture and rural development implemented;
- maintaining 31,500 jobs and creating 4,000 new jobs in the maritime and fishing sector"(The European Commission, 2021).

According to statistical data, in 2020, despite the pandemic situation, the level of expenses recorded within the projects increased. For example, in terms of cohesion policy "an acceleration in the level of project spending, reaching 39% of the planned allocation (€12 billion) by the end of 2020, up from 26% at the end of 2019..."(The European Commission, 2021). These statistical data demonstrate, however, that despite the difficult situation created by the pandemic at the beginning of 2020, by the end of the same year project managers managed to reorganize their activity and achieve even better results than the previous year.

Case study - Analysis of absorption level of European Structural and Investment Funds in the pandemic period

In general, regarding the level of absorption of Structural and Investment Funds recorded in the period 2014-2020, a period in which the pandemic also occurred, Italy is in the top of the countries, followed by Poland, then Spain, Romania being in seventh place(The European Commission, 2022). Thus, in 2020, Italy recorded an absorption of 44% of the money allocated by the European Union, meaning 19,860,371,450 EUR(The European Commission, 2022), Poland recorded an absorption of 59% of the money allocated by the European Union, meaning 50,510,591,580 EUR(The European Commission, 2022), Spain recorded an absorption of 45% of the money allocated by the European Union, meaning 17,918,461,720 EUR(The European Commission, 2022), and Romania recorded an absorption of 50% of the money allocated by the European Union, meaning 15,536,030,600 EUR(The European Commission, 2022). In 2021, the level of absorption recorded by the states increases, Romania reaching 57%, meaning 19,711,010,169 EUR(European Commission, 2022).

Conclusions

In conclusion, despite the attempts of the pandemic to turn an entire economy upside down, the European Union, together with the villages that enjoy projects financed from the Structural and Investment Funds, have once again proven that the power lies in the many and that a good organization can help us overcome any obstacle. From our point of view, even if, as we saw in the content of the paper, the individual entities, led by the project managers or even the states led by their leaders, were not at all prepared for such a disaster, the ability to reorganize and rethinking the strategies that most of these subjects showed afterwards helped us to avoid a lot of negative effects. We also believe that the best management and removal of unforeseen dangers was demonstrated by the leadership of the European Union, which managed in an extremely short period to reorganize itself from scratch and find in the shortest possible period the most good solutions to the problems that arise. A very good example is the very process of reallocating the Structural and Investment Funds and the creation of NextGenerationEU, which, according to the European Union, "is more than a recovery plan - it is a once-in-a-lifetime chance to emerge from the pandemic stronger, to transform our economies and societies and to rebuild Europe in a way that benefits us all" European Commission, 2022). Namely, this proved to us once again that we live in a strong community, with the ability to analyze and solve problems.

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AN ANALYSIS OF FINANCING SMEs IN THE ROMANIAN ECONOMY DURING AND POST COVID-19 CRISIS

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Abstract

Purpose – *The aim of this paper is to show how financing SMEs has changed during and post COVID-19 pandemic in Romania. The paper analyzes how the financing of SMEs changed in the period of Covid and what are the perspective after Covid.*

Methodology/approach -*The article uses quantitative research using reports published by Research Institutes or professional associations.*

Findings – *Romanian SMEs tend to use self-financing as the main source of financing their activity and the alternatives sources tend to become more interesting. As a result, the factoring, leasing and crowd-funding market are increasing.*

Research limitations/implications – *The research offers a non complete image regarding the financing of the Romanian SMEs after the COVID crisis due to the limited access to data regarding the sources used by companies.*

Practical implications – *The paper offers to the interested parties (researchers, entrepreneurs etc.) ideas about alternatives sources of financing besides the traditional ones and the way that they can be used to optimes the capital structure of the companies.*

Originality/value – *The research offers an analysis of the alternative sources of financing for Romanian SMEs and propose solutions to consider in case of future crisis.*

Key words: *financing, SMEs, crowdfunding*

Introduction

The paper analyzes the data regarding the main sources for small and medium enterprises comparing the situation before the COVID-19 crisis and after.

For start-ups, typically money is raised from the 3 F (family, friends and business angels). They are not eligible for other sources of financing like leasing, factoring, bank financing due to the fact that they don't meet the criteria requested by the banks or financial institution, especially in terms of financial indicators, collaterals etc.

Finding financing it is crucial for start-ups (Cassar, 2004), not only in time of crisis but also in, as we say now, "normal life". There is a limited number of studies regarding the response of entrepreneurs to the changes brought by a crisis, but as previous research shows (Festel, 2011) most of the startups doesn't understands or preview all the consequences that come with a crisis, interruption in production, lack of capital, lack in human resources etc.

Financing stages for SMEs

Different types of financing are adequate for different stages of companies: seed financing, start-up, venture capital, mezzanine financing and loan bridges and initial public offering (IPO).

Pre-Seed funding is the first step in financing a company and sometimes is not taken into discussion because it is a phase of financing when the company doesn't exist yet, when capital is usually raised from entrepreneur's own resources, family and friends and investors known as funding angels (Gourinchas, Kalemlı-Özcan, Penciakova, Sander, 2020). Funding angels are a viable option for founders, because besides their capital, they bring their knowledge, business network and they invest time in the operational activities of the new future company.

For the next stage of financing, seed financing, when company seek to raise capital, they usually tend to reach to business angels, because at this point, they are not eligible for loans, as they don't have any financial results or collaterals to present. At this point, the capital raised by a start-up can vary from 10.000 USD up to 2.000.000 USD according to Halo Report in 2020.

Another option for this stage, could be nonrefundable founds, governmental programs etc.

Venture capital is suitable for companies which already reached a certain maturity and they want to expand, develop new products, enter new markets etc. Those companies can turn to several source of financing, depending their field of activity, their type of investment. Literature split the venture capital in rounds, series A, B and C.

Series A for a company means an important step in its development, because it shows that the company has a minimum viable product (MVP). The capital invested in this stage is up to 10.000.000 USD (EUR).

Series B and C are taking the companies to the next level, preparing the business if this is what is intended to IPO. The amount of capital raised in series B and C is up to 50-60 million series B and up to 100 million series C.

Traditional and alternative sources of financing for Romanian SMEs

A survey conducted by the European Investment Fund in 2019 shows that Business Angels are oriented to pre-seed and start-up companies who activate in Artificial Intelligence/Machine Learning and E-commerce, FinTech and there is also interest in sustainability and cleantech.

In 2019, before the beginning of the Covid pandemic, the business angels questioned in the survey appreciated that the current business environment is good/very good and 57% considered that it will remain the same, and 33% even anticipated that it will improve (Kuckertz, 2020), so nobody expected the Black Swan event – the Covid.

SME have been, as the whole world, surprised by the Covid crise and they reacted differently in terms of liquidity. There were companies who anticipate great long term negative impact (Thorgren and Williams, 2020) and those who considered there will be little impact.

The companies who anticipate that the crises will affect their liquidities for a long period of time took measures like: deferring investment, try to access governmental founds, reduce their costs, renegotiate terms of contracts, loans etc.

Romanian companies, like all other companies were strongly affected by the Covid pandemic, and even if all types of business were affected, SMEs suffered mostly because they don't have capital reserves, low level of assets, not very innovative and they usually have a low rate of productivity. All conducted researches estimate a high rate of bankruptcy because of Covid [6].

The paper presents the financing of the SMEs and the methodology consist in an analyze of the main source of financing for this companies: self-financing, loans, nonrefundable founds, business angels, leasing and factoring and crowdfunding.

Self-financing

Self-financing is the most used and known source of financing and all data shows that all companies are using their own resources to finance their activities. And this tendency is more pregnant in the tech sector. The pandemic hit harder in this domain, and a study made in 2021 on 117 Romanian tech start-up shows that 70% of the tech companies were affected by the Covid crisis. The main problem for this companies is seeking new financing sources due to the fact that self-financing has a big disadvantage, meaning is limited and in time of crisis this aspect is more challenging.

The cash-flow difficulties were a reality for all SMEs and all governments tried to find solutions in the pandemic to help business overcome this period. The Romanian government adopted a series of measures like non refundable funds, tax reduction or no penalties for delays in tax payments etc.

Loan

As mentioned before, loan is not a source of financing for all companies, because start-up has practically no access to this type of financing due to the lack of collaterals, no previous financial statements, so they are high risks for banks. Nonfinancial companies use loans for financing their current activities or their investments, but the Covid crisis made the SMEs more cautious regarding new loans due to the fact that not all activities recuperated, there is a lot of uncertainty on the capital market. A study conducted on 11000 companies, made by BNR shows that a high percentage of companies used reinvestment of profit, self-financing, selling their own assets or loans from the company owners and a reduction in accessing bank loans, even lines of credits. Compared to 2020 the percentage of the business who didn't use any financing from bank or financial institutions (IFN) is increasing from 75% up to 77%.

Also, the study shows that bank loan was used as a source of financing only by 7% of the companies and a big problem that this study shows is that less than 1% of the SMEs access European funds. This situation indicated the fact that companies don't benefit from the financial leverage because they rely on their own capital and also the low rate of European funds absorption. This situation can be observed in Fig 1.

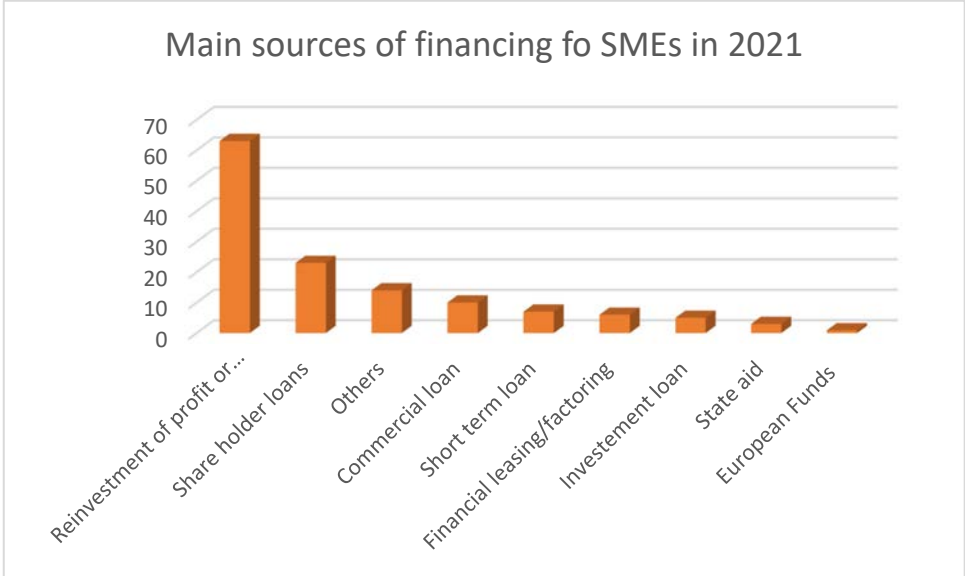


Fig 1

The lack of interest for bank loan for SMEs has been explained by the collateral requested by the bank (value or type), high level of interest rate and bank commission and bureaucracy. Another observation that can be made based on this research is that nor leasing or factoring are used for financing the company's activities and this is a topic that can be investigated in another paper.

The Romanian government came with a response to the economical crise under the form of a financing program known as IMM Invest Romania, which provides access to bank loan for companies and the aid consist in providing collateral up to 90% of the loan amount, no interest or other initial cost for 8 months, no risk commission and the amount of the loan is up to 10 million lei for investments and 5 million for working capital. Besides IMM INVEST, small companies can obtain financing through IMM Leasing, IMM Factor or Agro IMM Invest, depending on their activity or type of investment.

Business angels

They are known as successful entrepreneurs that are interested in finding new possibility for investment and they are a solution for incipient business that are searching for financing, because their own

resources are insufficient and banks or other types of financing are out of reach due to the lack of collateral or financial statements.

Before COVID-19, data shows that, more than 60% of the early-stage investments in European companies are made by angel investors (EBAN 2019) but some signals have been mentioned by Luigi Amati, president of Business Angels Europe saying that if angel investing breaks down, you break down the whole pipeline of development”.

There is limited information regarding the activity of business angels during the pandemic period due to the fact that not all business angels are part of registered network, nor all their activity is public.

An analysis of the Romanian companies during the Covid period showed that the newcomers (start-up and unicorns) fund this period as beneficial for financing through BA because they perceived this crisis only as a short market disruption. It was a little more difficult for companies in a later stage to find financing but the report on venture capital on 2021 shows that average amount invested in seed rounds in 2021 has almost doubled in size, going from €591k in 2020 to €1.07M (taking into account the FlowX round).

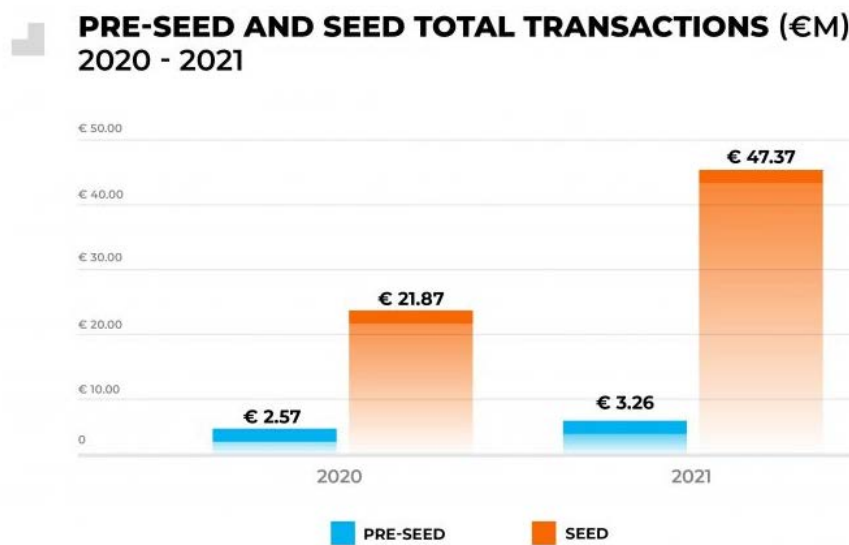


Fig. 2

Before Covid, In Romania business angels oriented their investment in companies related to E-Commerce, 3 from 5 rounds were dedicated to this type of business. The medical crisis didn't interrupted the growth of E-commerce, FinTech but two other types of business attracted the attention of BA: Digital Health and EdTech. In the medical area, digitalization wasn't a new topic but the Covid crises accelerated this process, SanoPass and Peditel are some of the names with big plans for 2021.

Leasing and factoring

These two types of financing are suitable for working capital financing or equipment financing. As seen in fig. 1, companies use leasing and factoring in a very small percentage (less than 10%), even though these solutions can help overcome liquidity problems in crisis's periods.

As financial and operating leasing are well-known and used by Romanian companies for financing equipment investment, the paper emphasizes on a special type of leasing, the sell and lease back. This type of leasing is suitable for companies who want to develop or continue their production, they own large amount of tangible assets but they need capital to buy raw materials, pay salaries and they can't use bank loans. This was, actually, the situation for a lot of Romanian SMEs during Covid crises.

The solution to continue production, satisfying their clients and keep their employees could have been the sale and lease back financing. This is a contract that combines two transactions simultaneously: a sell and a lease. The company seeks a leasing company (investor) and sells her tangible assets to the

investor and at the same times leases (rents) back the assets for a determined period of time (up to 48 months usually). The operation can be analyzed in fig 3 The lease contract is a contract with a firm option to buy all the items at the end of the contract. This solution provides the company with the necessary cash-flow, maintaining in the same time the use of the equipment, in order to continue its activity.



Fig. 3

As for factoring, even though this type of financing is known for several years now, there are many SMEs that are not even aware of this financing alternative. A study made by the Factoring Romanian Association (ARF) shows that the factoring market grown in 2021 with 20% compared to 2020, reaching a volume of 6 billion euros. The same study shows that only 21% of this market is represented by companies with a turnover less than 5 million euros, most of the factoring transactions (42%) were made by companies with a turnover > 50 million euros.

Another fact that can be observed and mentioned regarding the factoring market was the reverse factoring that increase in 2021 with 28% with an amount of 2,3 billion euros (more that 1/3 of the factoring market). This is a great news because reverse factoring is a solution for very small companies depending on a single or limited number of clients, which can only use factoring through this type of factoring, because they are not eligible for traditional factoring.

Also, the European market shows the same trends after the decrease in the pandemic period, the overall volume reached €2.0 trillion, up from €1.8 trillion in 2020, with international factoring comprising 23% of the total value according to the data collated by the EUF Economic and Statistic Committee for 2021.

This growth is explained by multiple factors: the rebound of European economy, rising prices for raw materials, energy, shipping cost, inflation, but the growth of factoring market is much higher than the inflation and the increase of GDP and that means that in time of crises factoring starts to appear as a reliable source of short-term financing.

Crowdfunding

Financing a company through crowdfunding is one of the newest solutions for raising capital. This type of financing is suitable for pre-seed or start-up companies, which are seeking for funds, but can't access non-refundable funds or bank loans, because they are in a phase that they aren't complying with the requests for obtaining this kind of financing. Crowdfunding means that a company is raising capital through its potential clients, who are "paying" in advance for a product which is launched using an internet platform. Besides raising capital, the companies can benefit from the accumulated know-how and they validate their ideas.

Globally, the most known and used platform for crowdfunding are Kickstarter and Indiegogo. In Europe, there is a major interest to normalize this type of financing, especially to protect the persons who invest in those start-ups and beginning with November 2021, a new Regulation has been introduced in EU, including Romania. But for now, in Romania there is a legislation regarding crowdfunding (Law 244/2022), applicable beginning with 6th August 2022 who regulate aspects like: an authority who survey the crowdfunding platforms, sanctions and penalties for bad behavior on the crowdfunding platforms,

the condition for the transfer of equity (social parts) in companies financed through crowdfunding and in case of indivisible or nonliquid social parts the creation of a special purpose vehicle (SPV).

According to statistics, in Romania in 2022 the transaction value for crowdfunding financing is projected to reach 0,71 m in 2022, with a decrease of 16,3% compare to 2021. This decrease can be also the result of the impact of the Ukraine war on the market. The most known Romanian platforms for crowdfunding are: Startarium and Seedblink (the first equity crowdfunding platform develop in Romania). Also, the company High Crowd Estate Technologies has announced the launch of a new crowdfunding platform in the real estate sector.

This shows that crowdfunding is a solution who is getting more and more interest for start-ups and also for businesses who intend to scale up and are in need of capital.

Conclusions

Financing business's activities is one of the main managerial decisions for a company and for small and medium enterprises raising capital and finding resources to finance investments and operating activities is a challenge especially in time of crisis like Covid-19 pandemic. Romanian SMEs like all companies were severely affected by the changes in the economic market brought by the medical crises. They were forced to adapt to the new way of doing business, implement digitalization, remote labor and also search for new financing solutions, besides the traditional ones like self-financing and bank loans. Leasing and factoring market are increasing, which is a sign that companies implement more and more alternatives solutions like reverse factoring, or as proposed in this paper, in time of crises lease-back could be a viable solution for short term financing for companies with high amount of tangible assets. Crowdfunding is also a tool to be considered, for start-ups especially.

It is important for SMEs to adapt their way of doing business and in terms of financing, to reach for alternatives sources because crisis like Covid-19 pandemic or Ukraine war will happen in the future and they have to be prepared for them.

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MANAGERIAL PERCEPTION OF OPEN INNOVATION AS A POST COVID OPPORTUNITY

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Abstract

Purpose – This study explores the industry managers' perception of open innovations, potential benefits, and expected barriers when adopting the open innovation concept.

Methodology/approach - We used a qualitative approach by interviewing 13 managers and investigating case studies. We concluded that applications of open innovation attract more research.

Findings – Case studies describing the best practice and the most common barriers to participation in an innovation network are necessary to understand the field better. In addition, we find out that exploring and understanding the managerial perception of open innovation and how this concept appears on the public agenda is necessary.

Research limitations/implications – Some limitations due to methodological aspects, issues regarding research samples and the techniques for collecting the data.

Practical implications – Through exploratory research, we aim to identify the managerial perception of the concept of open innovation. Regarding the manager's role in dealing with this kind of innovation, we are interested in whether open innovation is associated with leadership characteristics.

Originality/value – This study addresses the concept of open innovation, that hasn't been applied in the industry and is quite controversial in the literature. In the past decade, research on open innovation has brought renewed attention to the ways in which companies can gain from interactions with external sources of knowledge and innovation.

Key words: Innovation, Manager, SMEs

1. Introduction

To be competitive and successful in an ever-changing business environment and in a dynamic market, companies need to innovate. In innovation strategy there are different degrees of openness to the external environment. Three types of innovation strategies are identified: open, semi-open and closed. Open innovators are those who primarily use open source in their innovation projects, while the semi-open ones don't use external sources unless in less important phases of open innovation process, opening it depends on the absorption of the company and the need for external knowledge (Barge-Gil, 2010). Implementation of open innovation requires a change in mindset and a change in organizational culture. It requires openness to the ideas of others and the desire to share knowledge. This requires a new vision to the way innovation is traditionally understood.

After only a decade after its appearance in literature, the concept of open innovation has grown into a thriving area of research in innovation management. Increased interest in open innovation is manifested by the rapid growth of scientific publications on this concept and the frequency with which the concept appears as a theme in management journals.

Open innovation, as a term, was promoted by professor and executive director of the Center for Open Innovation at the University of California, Berkley, Henry Chesbrough as a response to recent technological advances and significant changes in the business environment. This concept refers to the user's innovation, cumulative innovation, trade of knowledge, mass innovation and distributed innovation, "open innovation is a model that assumes that firms can and should use external ideas as well as internal ideas, and internal and external paths towards the market, as the firms are turning towards technological advance "(Chesbrough, 2003). Or, as defined by Stephan Lidegaard (2011): "Open innovation is about creating a link between internal and external resources and acting with these opportunities" (Chesbrough and Bogers, 2014).

One particular area which is becoming more and more important in open innovation is the development of collaborative innovation that combines the inputs and output of knowledge. As association process, collaborative innovation combines inputs and outputs, allowing associated organizations to develop and to put joint innovation in the market.

Of course, as it spread, the concept of open innovation also attracted criticism. Dahlander and Gann (2010) note that although in existing research there are various definitions and points of interest, it lacks a coherent analytical framework. The authors pointed out that the lack of this analytical framework makes it difficult to compare and validate the results reported in open organization.

The pandemic produced a series of challenges for businesses in all countries and they had to act quickly and decisively. In the recovery stage after the pandemic, companies should identify and benefit from the new opportunities that have appeared. But for this it is necessary to take into account the lessons learned during the pandemic, that is, to make certain evaluations after the action. Companies will have to prioritize their actions and strengthen their strategic resistance. Thus, they will be able to benefit better from the opportunities that appear in the post-pandemic period.

In terms of innovation for development, there have been a number of programs with real gains on a large scale. They include: using mobile money and microfinance to boost financial inclusion and small business development, then reducing costs and facilitating access to medicines in low-income areas. All this involves a series of technical problems related to innovation, but also business planning problems (Ramalingam and Prabhu, 2020).

This study explores the industry managers' perception of open innovations, potential benefits, and expected barriers when adopting the open innovation concept.

The rest of the paper is structured into four sections. The next section reviews the relevant literature in the field of innovation, while the last three sections would provide the methodology, the research approach of the study, and conclusions.

2. Literature review

It is considered that at present the need for innovation is very high, even urgent, as it greatly influences the social well-being and economic development of a country.

Incentives for innovation, investment and education are crucial and institutions need to provide a framework for these incentives (Kramer, 2016). It is up to governments to find the most effective ways to act, but they must be correlated with the specifics of each country.

Many industrialized countries, to increase efficiency, place the company at the center of the strategies they adopt. Therefore, those policies will be designed to support the development of small businesses and start-ups, providing support for the entire life cycle of new products (Sadeh, 2013), from design to internationalization. Very important in this sense are the business incubators, they ensure an important role in the survival rate of young companies.

Moreover, for all countries, including those in Eastern Europe, it is important to keep in mind that production capacity does not automatically lead to innovation capacity. Overall, Eastern European countries are inefficient both in converting their research, development and innovation capacities to appropriate levels of productivity and in transforming research and development capacities into results such as resident patents, etc. (Kravtsova and Radosevic, 2012).

Regarding Romania, it is considered that public and private investment in infrastructure, education, healthcare, social inclusion, and innovation could improve productivity and growth in the long term. At the same time, Romania's modest performance in the field of research and innovation limits growth prospects, and the overall innovative capacity of the economy remains low.

For a country to have a competitive economy, it is very important to produce applied knowledge itself. This is because the application of innovation in the economy brings benefits to everyone, including for those who do not innovate or work in innovative sectors. As for Romania, it should also learn from the experience of other countries that have developed innovative areas and that allow for sustainable development (Pop, 2014).

Ihl et al. (2012) showed that structural dimensions, such as specialization, formalization and decentralization, affect the gains from open innovation. Also, it appears that R&D-intensive firms do not make additional gains from open innovation, while low-R&D firms can successfully replace their own internal R&D, at least to some degree of openness (Naqshbandi and Kamel, 2017).

It is possible that the paradigm shifts caused by the pandemic will have far-reaching long-term effects. Organizations should pay attention to the new consumption trends, while identifying the measures that can be taken to protect their financial integrity and the ability to operate profitably. Certain industries such as: entertainment, sports, airlines, restaurants, etc. are forced to find new ways of action and opportunities to be profitable in the new business environment (Howe et al., 2021).

Howe et al. (2021) pointed out that a mentality that tries to aggressively return all work activities back to normal could have a negative impact, with harmful results on the performance and turnover of companies.

Ramalingam and Prabhu (2020) talked about the need to reset the economic system and ensure an "ecological recovery" in the post-pandemic period. This implies policy innovations, but also related organizational and technological innovations.

3. Methodology

To achieve the study's objectives of the study, we conducted qualitative interviews with managers of SMEs who participated in such projects. We chose this exploratory investigation method because it is suitable for new themes, is little researched, and doesn't have a very solid theoretical foundation as open innovation. We selected 13 industrial companies from Romania that, according to previous research (Dimensions Innovation in terms of change management), said that conducted open innovation. Out of these, 7 agreed to participate in the study. The fields of activities of the participating companies are textiles, furniture industry, aluminum joinery and metal constructions. They have 11 to 294 employees and have been in the business from 11 to 23 years.

We collected data through interviews with managers or directors of these companies based on semi-structured guides. The questions refer to the perception of managers on the obstacles and benefits of the projects of open innovation, the employees' motivation in such projects and the essential elements of such an approach.

4. Results and discussion

We aimed to identify the managerial perception of the concept of open innovation and the appearances of online business media on this concept. Regarding the manager's role in dealing with this kind of innovation, we are interested in whether open innovation is associated with leadership characteristics. It is an empirical study on a topic that is currently very little research. We'll find out what managers think about open innovation. The research objective was to find out the perception of managers about open innovation, specifically the benefits and obstacles perceived by those who have undertaken such projects.

The data was collected through interviews with managers or directors of these companies based on semi-structured guides. The questions refer to the perception of managers on the obstacles and benefits of the projects of open innovation, the employees' motivation in such projects and the essential elements of such an approach.

The main barriers identified by managers in implementing open innovation are:

- Lack of familiarity with the concept.
- Reluctance of companies facing such projects.
- Concerns with Intellectual Properties by potential partners.

The main benefits that managers think that open innovation brings to a company are:

- It offers a fresh perspective on their projects
- It reduces innovation risk.
- It reduces costs.

In small and medium businesses, innovation becomes a strategy when the product is a generic and when differentiation from the competition is made by the price alone. Such a strategy is needed more than ever because of the technological complexity of shortening the product's life cycle. Thus, to differentiate and create value in a market that puts pressure on existing products, firms choose innovation as their business strategy. Although the interviewed companies do not use very high technology (due to their domain), the technological process has an important role in innovation strategy because it is a way to create value for the end consumer, which translates into economic value of the product. Unlike large companies that have resources at hand for in-depth analysis of market trends or to test latest technologies, in the case of SMEs, the manager/business owner is the one that most often establishes, based on his personal beliefs and his vision on market developments, the company's innovation strategy. Two of the managers believe that open innovation is not an option, but a requirement given that SMEs do not have the skills and financial resources needed to develop the technology on their own.

The most common notional categories associated with the concept of open innovation found in the transcript of the answers are "partnership", "partner", "complementary", "contact", "external environment". In the "partner" category: „clients“, „consumers“, „firms in the same field“ and „researchers“ were included.

After analyzing the answers received from the managers, we identified several key elements of an open innovation project.

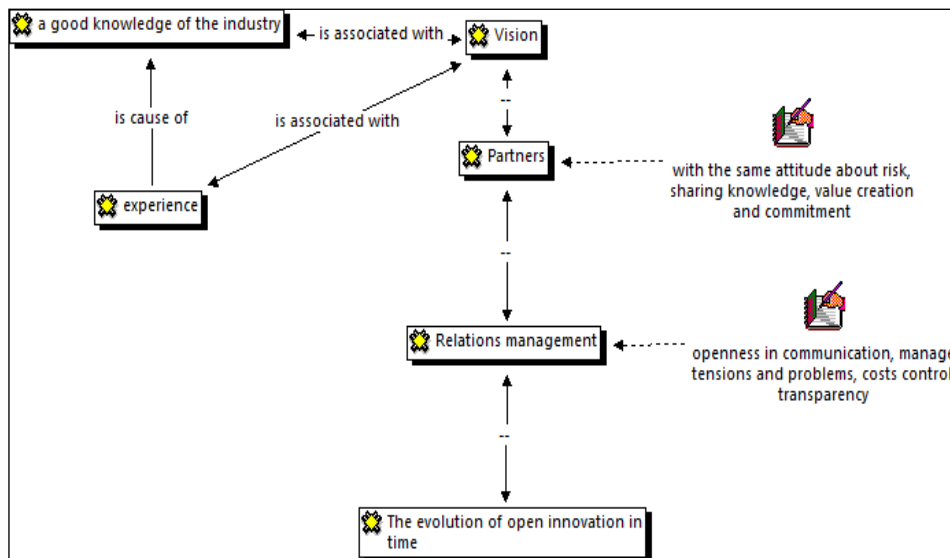


Fig.1. Aspects of open innovation
Source: Authors' computations

The vision. Most of the time, a manager' new vision is the start of a new business mode. This vision must be based on experience and a good knowledge of the domain in which the company operates.

Partners. Open innovation involves a network of external partners, which might be companies in the same field, research centers or universities. Partners are identified depending on technology, skills and market position. The size of the network depends on the products or services that are sought to be done.

Managing relationships with partners is an important aspect of open business models. This should be considered the making of common value and the distribution of this amount between partners. Sometimes, there are tensions but partners must always be aware that common values are greater than that which could be achieved by each on their own. Unless open network partners perceive benefits as greater than those of a classic innovation strategy is the network sustainable and can achieve its goals. Building strong relationships based on trust and transparency is essential to cope with market risks. Personal relationships between the involved parties are also important.

Projects' evolution. An open innovation project does not end with the launch of a new product, it is just the beginning. The involved companies acquire new skills and thus become more competent, more profitable and such initiatives always generate new opportunities. On the other hand, the market is very dynamic and new products can be taken over in a relatively short time and new strategies always must be taken into consideration.

SMEs' competitiveness doesn't only depend on the employees' skills but also relational capital the company has, as it strengthens the bargaining position and makes the company alert to the other companies in the same area.

One of the questions for managers refers to the necessary qualities for a manager to successfully start and run open innovation projects. This analysis answers one of the questions of the study, namely, whether the managers' perception of the necessary qualities for open innovation coincide with those of a leader. The common characteristics of these two identified dimensions in the answers received are: openness to the new, the existence of a strategy, the ability to manage relationships within a team (in and outside the organization), including conflict management, risk taking and knowledge sharing.

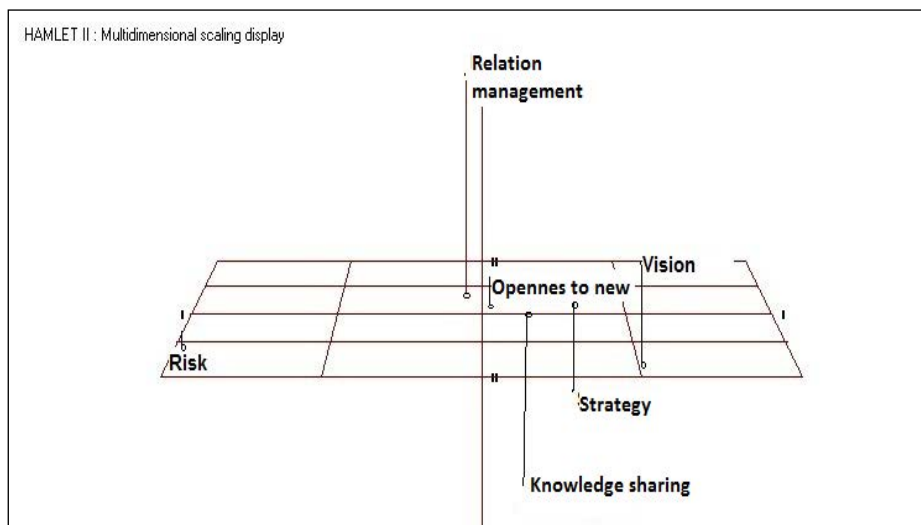


Fig. 2. Qualities necessary for the initiation and development of open innovation projects
Source: Authors' computations

An important aspect of an open innovation project is the intellectual property. For a better management there is the need to clearly define each involved member's commitment. Development of common knowledge can be protected by certifications, trademarks, patents and licenses. In the case of the companies surveyed the managers say they don't choose co-patenting, but they prefer to establish through contracts the rights of use of the inventions made. This can cause problems and tensions, but it's important that partners remain focus on the value created and to ensure transparency in their activities on joint projects.

The press and other media mean *par excellence* vehicles that help to build the image of an event, a phenomenon or a new trend and accredit it as such in public space, justifying the scientific approach to communication. We tried to identify if the concept of open innovation appears in the press of online

business. The results were surprising. This concept only appears in few isolated business articles. For data selection we used intentional selection, guided by aiming at research, named *theoretical sampling*. Since the proposed topic is well-defined, data selection meant choosing media sources having published articles about it. The concept was found only on the following sites: <http://incomemagazine.ro/> sites, with two articles published on the subject in 2009 (*SMEs and innovation management*) and in 2012 „*Geniuses: solitary or collaborative? Where does innovation in business come from?*”, <http://www.businessmagazin.ro/> with the article „*integration of the Lego brick in the digital era*” published in 2014 and <http://www.revistabiz.ro/> with the articles „*leaders after the 2011 crisis*” and „*how competitive is Romania?*” in 2014.

Conclusions

A common aspect of the answers received from the managers surveyed is focusing the company's efforts on creating value for a certain category of customers. They start with a coherent idea about a customers' need, about the one thing which the customer assigns value.

This begins innovation in an existing business model. Sometimes the new business model is simple, and sometimes it is shaped by a complex process that can take months and is followed by decisions on what technologies will be used and the potential partners.

Although an open innovation project is emergent, it changes over time, discoveries and adjustments are made, and it should have a complete business plan. When firms innovate, they increase the functionality of a product, make it more affordable for the customer (in terms of use), add a service to an existing product, or offer customers new experiences. The latter is difficult to accomplish but always proves profitable in the long-term and significantly improves the company's market position.

The changes that make innovation needed are usually the emergence of new competitors, changes in legislation, technological developments, changes in the consumer's behavior: new expectations concerning the company's social responsibility or environmental impact. The change category especially offers opportunities for sustainable innovation and brings measurable results in the company's profitability. The benefits compared to large companies are agility, dynamism, and the ability to specialization for services/customized products. SMEs also exploit the opportunities offered by smaller markets which are of no interest to large companies.

The concept of open innovation should be investigated in more detail. Case studies describing both best practice and the most common barriers to participating in an innovation network are absolutely necessary to better understand the field. In addition, we consider it is necessary to explore and understand the managerial perception of open innovation, the mode of organization, and how the manager communicates innovation among his employees.

By its very nature, innovation involves taking risks, oscillating between successes and failures. In the context of the pandemic, health-focused innovations are the most visible forms of innovation. We then talk about many innovations that address the indirect or secondary impact of the pandemic, including: public policy measures taken to help businesses hit hard by the pandemic, innovations to strengthen social solidarity, and organizational innovations to deal with lockdowns (e.g., increasing methods of online work) (Ramalingam and Prabhu, 2020).

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SELF-DYNAMIZATION WITHIN THE FORMAL GROUP IN THE ONLINE ENVIRONMENT

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Abstract

Purpose – Because digitalization is the foundation of a new era this paper proposes to make group work efficient in the online environment.

Methodology/approach - The issue of identifying psychosocial models for streamlining work teams in the online environment, regardless of the psychological profile of members involved, has become topical research.

Findings – Through the concept which we have developed, we want to introduce a cohesive workshop group model, specific to the online environment.

Research limitations/implications – Due to the current pandemic context, it has migrated to the online environment in all fields of activity.

Practical implications – The continuous development of Industry 4.0 have extended the boundaries of production, those of human relations but also those of knowledge. Since the onset of the pandemic and the strong entry into online meetings, the issue of integrating group workshops in the field of work, both in education and in the industry, has been stated.

Originality/value – We initiate a practical approach, for streamline group work in the online environment, and this can be achieved by combining individual skills with the requirement of the new social constructs.

Key words: Online environment, workshop group, pandemic context.

Introduction

In the current work field, new challenges have emerged related to the welding of solid work groups to operate in the online environment. Moreover, through the way of working imposed during the pandemic, the need to overcome spatial barriers and to establish the virtual environment as the main establishment for almost any type of activity was emphasized. This fact has many advantages, if the spatial boundaries are overcome, but many challenges arise, related not only to the adaptation to the proposed technologies, but also requiring a certain conduct of integration within the formed communities.

In the study conducted by Kareem, M.A. and Mijbas, H.A. (2019), they state that only through the techniques implemented by the human resources department can sustain a relationship between organizational effectiveness and dynamic capabilities, so that organizations, in order to achieve organizational effectiveness, need a good HR department human resources to implement learning, response and reconfiguration models for routine work, these representing conditions and capacities for dynamizing the environment.

Through the research carried out by Ahmad, Z., et al., (2021) it was observed that the difference between the human resources practices intended by the organization and those implemented by it, "negatively influences organizational performance, but this fact can be improved by involving employee participation" in the process of implementation and organizational development.

Also, dynamic capabilities can be directly influenced by the entrepreneurial spirit, which was also expressed by Fitriati, T.K. et al., (2020) in their work, dynamic capabilities representing those strategies through which both internal resources and external sources are used through which a company ensures its development and competitiveness.

Moreover, the entrepreneurial spirit, together with a competitive orientation towards the market, represent elements that can influence the degree of sustainability, a fact also emphasized by Rosini, I. and Hakim, D.R. (2021).

The dynamic capabilities established through organizational capabilities are closely correlated with proactivity, innovation, and performance, in the sense that proactivity and innovation influence the performance of companies by promoting and supporting it, a fact expressed by Bature, S.W. et al., (2018) in the conducted study.

Rozak, H.A. et al., (2021) underlines that the change in the organizational system can be done by promoting agile entrepreneurial spirit that can influence dynamic capabilities, in the sense that, through this model, the consolidation and efficiency of the digital ecosystem will be reached.

Dynamic capabilities are based on a quality IT system, directly influencing the innovation process, the production process as well as the marketing process to ensure the performance of small and medium enterprises in the digital era, as shown by Wongwanich B. and Chienwatthanasuk K. (2021) in the study carried out.

Also, for a healthy, long-term development, it is necessary to apply an agile strategic leadership, based on small work teams with strong and dynamic links between their members, which can support innovation, a fact expressed by Chen, X. et al. (2022).

Recent research increasingly proposes the idea of a strategic management, where the central part is occupied by the micro foundations, with their three characteristics, namely, structure, process, and individuals, allowing to move from macro (societal) level to micro (human) level, per individual, which is the main actor for the development of dynamic capabilities, and for that it is necessary to implement a strategic leadership, stated Vera, D. et al. (2022).

In this sense, Chairunisa, F. and Tonapa, J.F., (2022) in their research propose a leader model that agrees generation Y members, being necessary to be a coach in finding solutions and not a manager of his own. Moreover, it is necessary that the tasks can be solved through collaboration, during their fulfillment a positive atmosphere and a motivating framework should be created, and the evaluations should be correct.

Although they are similar in terms of the use of technology, the members of generation Z are different from the members of generation Y, being similar to the members of generation X, who preceded the millennials, who were more anchored in the present time and concretely, having a sense of born of leadership, being more opened to taking risks, finding their personal pleasures more easily in the environment in which they work, as noticed Azhari, A.M. and Pritasari, A. (2022).

If, in the paper: "A model for estimating skills and competencies in Industry 4.0" I proposed a recruitment model based on the competencies required for Industry 4.0, which helps the human resources department by ensuring the optimal teams for each specific project through a recruitment process own to this era of digitization, by following the conception of dedicated execution teams, made up of members of the Y and Z generations who have the necessary skills and abilities, further, we aimed to streamline the production mode through the active and dynamic involvement of human resources, on which we consider a key factor (Suru, S.N. et al., 2020).

Next, in the study: "A model for predicting skills and competencies of Y and Z generation members for Industry 4.0", we sought to prioritize the competencies required for Industry 4.0 by analyzing the strong points of members of the Y and Z generation, and we realized that members of generation Y use social skills, as well as methodological ones, while members of generation Z are more attracted to technical skills and soft skills, which indicates that the latter will prefer a technological or informational update, instead of a face-to-face socialization. Through this approach, we aimed to improve the process of identifying suitable candidates according to their social, methodological, technical, and soft skills (Suru, S.N. et al., 2021)

In his research Sabbagh, M.A. (2021) developed the idea that the learning environment is not the same for everyone, because there are different styles of perception, namely, the visual, the auditory, the kinesthetic and the classical style, which assumes that the basis is taking notes in classes and their assimilation.

Methodology

Through the present research we try to find the answer to the following questions:

- I. In which way organizational performances are correlated to individual skills?
- II. Are the organizational skills affected by the relationship between individual skills and organizational performance?

Our concept is based on the participative management method and aims to discover new methods of making collaborative meetings in the online environment more efficient through psycho-social means of maximum involvement of everyone, regardless of their psychological or sociological profile, following a general model adaptable for all those who are currently present in the educational process, i.e., we target the members of generations X, Y and Z. We also consider it particularly important to capture the current evolution centered on the level of three dimensions, namely:

1. The dynamic skills dimension, which is made up of four other sub-dimensions:
 - a) detection ability,
 - b) learning ability,
 - c) the ability to integrate,
 - d) coordination ability.
2. Level of organizational performance.
3. The dimension of organizational skills.

The model we propose captures all these aspects and is configured for these dimensions, being designed for the organizational societal construct.

To develop the model, we started from the idea of a micro-leadership model based on the Agile system, in which each member of the online team is responsible for the team project. In this sense, each member of the team creates 4 levels of action, namely:

- I. The personal level, where everyone establishes his strengths.
- II. The inter-personal level, where everyone exposes the assimilated knowledge to the group.
- III. The testing stage, where, after testing all participants, it will be observed what gaps in assimilation and communication exist.
- IV. The configuration level, where, following the feedback received from the team, everyone realizes and will improve their assimilation and communication pattern.

These levels are individually configurable, depending on each person, considering the inherent characteristics, as well as the generation they belong to.

Thus, we configured our model according to the following steps, as shown in Fig.1:

- A. Step 1, which is represented by the reconfiguration of the course and teaching method:
 - a) Configure the parts of the course that can be taught visually through diagrams, figures, tables and illustrations, videos, the latter being very important.
 - b) Configure the parts of the course that can be taught aurally, through video sessions and, very importantly, through debates.
 - c) Configure the parts of the course that are supposed to be taught in the classic way by means of preconfigured and commented slides.

- d) The parts of the course to be presented in a practical (kinesthetic) way are configured, the students being placed in practical experiments and preconfigured workshops.

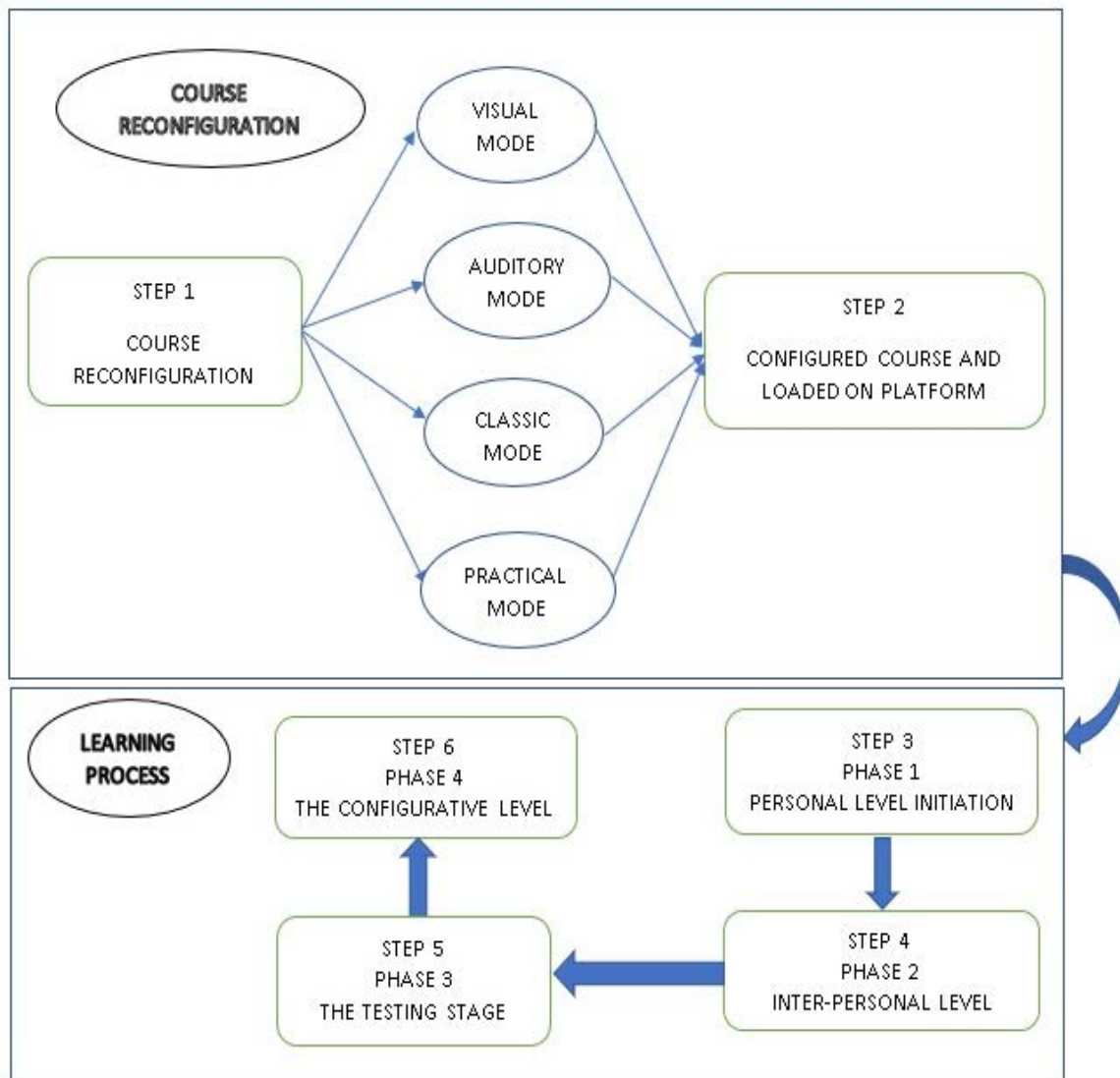


Fig. 1. Logical diagram of the course and learning reconfiguration process

- B. Step 2, the course is configured, and the material is uploaded to the virtual online teaching platform.
- C. Step 3, phase 1, "initiating the personal level": Students select at least two types of teaching, according to their personal preferences, on the condition that they take part in the two types of teaching, which they consider to be more suitable for them well, which means at least 50% of the course.
- D. Step 4, phase 2, "inter-personal level": within this level, learning teams are configured with 3-4 members each, which will be placed in a brainstorming session. For each team, the requirements of a completion project are established, which requires knowledge from all the content of the course, i.e., from the parts taught visually, auditorily, classically, and kinesthetically/practical.
- E. The condition for setting up the teams is that each member has the two chosen types of teaching the course totally different from the other members. In this way, the team is made up of students, who participated and assimilated knowledge from the entire course.

- F. Step 5, phase 3, the "test stage": The project is presented online, by each team, in no more than 15 minutes, and all other teams can participate and ask questions. This represents a testing phase as well as a deepening of the assimilated knowledge, because through the process of assisting other projects, respectively through interactive discussions, the knowledge is deepened. If each team manages to present its project in a clear, coherent logic and with cursive ideas, for the entire topic, it means that the necessary knowledge has been assimilated.
- G. Step 6, phase 4, the "configurational level": After each course, the feedback from the students is sent, along with suggestions for adapting and reconfiguring the course

In our previous work, we developed an operational model of an online group made up of members of generations X, Y and Z, where we proposed for them a type of mixed class for these three generations (Suru, S.N. et al., 2022). In this sense, through this paper we configure a type of mixed class that will contain elements of interest for each of the three present generations. Thus, we structure the course on several dimensions, namely video presentations and practical applications (which are preferred by members of generation Y, who have a preference for visualization), augmented reality and applications (preferred by members of generation Z, who have an advanced kinesthetic preference) to the virtual), and games, interactive tasks and bibliographic bonuses (for members of generation X, who have an inclination towards audition, the face-to-face relational kinesthetic style and the classic style of deepening through diligent study), a model that can be seen structured in Fig. 2.

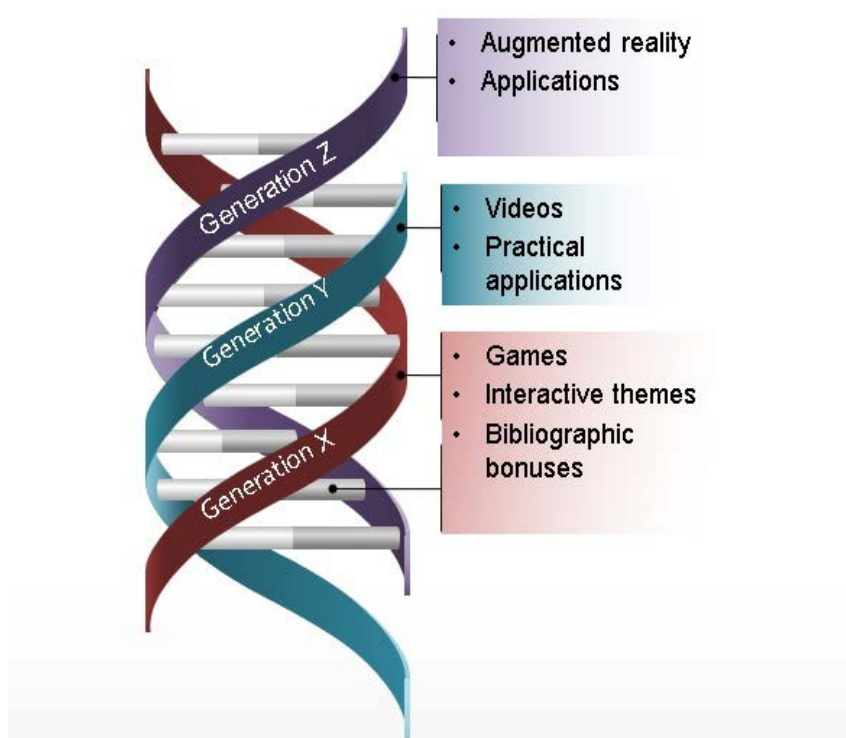


Fig. 2. The mixed class model for members of generations X, Y and Z

Thus, we conclude the realization of some inherent stages:

I. The first phase is that of the personal level, of learning a topic, of your choice, depending on the assimilation method learned, visual, auditory, kinesthetic, or classic, in this stage, members of generations X, Y or Z will internalize the information from course, depending on the channel of communication and assimilation preferred by them. The dynamic skills involved here are detection and learning.

II. The second is represented by the inter-personal level, where the exposure intervenes, through which each tries to relate and explain to the others what he understood, in his own way (visual, auditory, kinesthetic, or classical). The dynamic skills that apply here are those of integration and those of learning.

III. The third phase of the testing stage, is a control phase, in which, with the help of testing, all the knowledge assimilated along the previous stages is verified. The dynamic skills that are applied here are those of coordination, but also those of learning.

IV. The fourth phase of the configuration stage, is the one in which the feedback is received, which will help to improve the assimilation and communication techniques. In this stage, all the four dynamic skills presented are developed, namely those of coordination, learning, detection, and integration (all these are presented in the concept proposed by us through Fig. 3).

In the model shown in Fig. 3, it can be seen how each stage helps to achieve dynamic skills, and the process is a continuous one of dynamism and training for each participant.

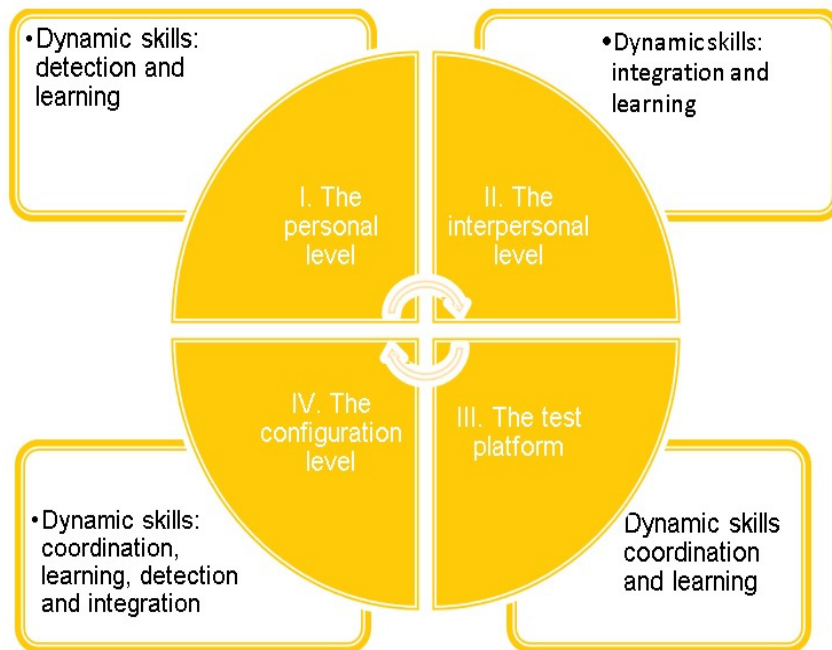


Fig. 3. Self-dynamization model within the formal group in the online environment

Discussion and conclusions

Through this paper, we create a feasible model, based on the participatory management method, so that information can be disseminated and assimilated more easily in the online environment, depending on the internalization specifics of each one (visual, auditory, kinesthetic or classic) and the generation of which X, Y or Z is a part, and the collaborative meetings in the online environment should take place in optimal conditions, through psycho-social means of maximum involvement of each individual, they being able to develop and display dynamic skills/capabilities to the maximum. The proposed model is experimental, being configured both following the analyzed studies as well as from the proposals and interviews between teachers and participants. It should be emphasized that the visual, auditory, kinesthetic, or classical teaching methodologies were selected following the proposals of the course participants. It is also worth noting that the primary implementations of this concept were particularly successful, an aspect proven both by the presentation of the final projects and by the information obtained from the feedback given by the participants.

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DESIGNING A STUDY ON RESEARCH, DEVELOPMENT, INNOVATION ACTIVITIES IN PRODUCTION COMPANIES IN THE POST- PANDEMIC REALITY

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Abstract

Purpose – analyzing the research - development - innovation activities carried out in the production companies in Bihor county and following the influence that the pandemic had on their deployment.

Methodology/approach - Designing a questionnaire-based marketing research.

Findings – it is important to analyze the research and development activities and identify some levers that lead to their improvement, starting from the research of the concrete situation in the post-pandemic industrial environment.

Research limitations/implications – the designed questionnaire will be applied until the end of 2022 and the research results will be obtained, processed and published later.

Practical implications – obtaining a realistic picture of research and development activities regarding the production companies in Bihor county.

Originality/value – the direct involvement of production companies by collecting data directly from the economic environment of production companies.

Key words: research, development, innovation.

Introduction

Human progress has been generated by research and development activities constantly carried out, consciously or spontaneously. Nowadays, technique and technology are evolving at an accelerated pace, and to meet this challenge companies must modernize, develop, be flexible, predictable and quickly adapt to market demands. Everything that means evolution and development in the company's activity, regardless of the form, level and way of manifestation, aims to: increase productivity, increase product quality, decrease costs, rapid circulation of information of any nature and form, etc. everything in compliance with the principles of sustainable development. These objectives can only be achieved through innovative processes whose complexity has become increasingly visible. Research and development activities also fall into the category of innovative processes in companies.

This has led to the organizational development of innovative activities in two directions: some companies have created in their composition organizational structures specialized in research, development, innovation, others carry out these activities according to the needs faced by the company at a certain moment or context making use of the means at their disposal.

During the two years of the covid 19 pandemic, but also after that, the research and development activities carried out in companies also underwent changes. These changes were reflected in: the way innovative activities are carried out, the adoption of improved work procedures both at the organizational level and within work groups, the digitization of some activities to facilitate or even stimulate research - development activities, flexibility and growth of the adaptability of the personnel involved in innovative activities, etc.

Conceptual boundaries imposed by legislation

The Romanian legislation¹ defines research and development activity as consisting of: scientific research, experimental development and innovation based on scientific research and experimental development. In turn, scientific research consists of fundamental research (it aims to obtain new knowledge about the fundamentals of observable phenomena and facts) and applied research (it involves original investigation carried out to acquire knowledge for a specific, practical objective)². Likewise, experimental development is defined as the activity that aims to obtain new materials, products, devices, processes, systems or services by capitalizing on the knowledge resulting from scientific research and/or the practical experience of those involved in the process.

Regarding innovation, this is the activity of implementing a new or improved product, service or process or a marketing method used in the practice of institutions or companies. As a result, innovation can be: product, process, marketing or organization oriented.

All these activities – scientific research, experimental development and innovation – are the main ones that generate knowledge as the basis of social and economic progress. The national research-development system is structured starting from them and is made up of all public and private law institutions as well as the units whose object is research-development. In this structure, in the category of private law units, are also included commercial companies whose object of activity is research - development or structures within them, legally constituted, an aspect that implies:

- the existence of a decision of the management of the company to set up the organizational structure for research and development
- its own name, its own organizational and operating regulations
- separate accounting in the company's global accounting
- its own staff and management.

Only under these legally regulated conditions, companies can be part of the national research-development system. At this moment, in Romania, the research, development and innovation (RDI) system consists of 263 public RDI organizations and about 600 enterprises³. In accordance with the membership of the national research and development system, companies can benefit from a series of fiscal facilities that refer to incentives granted to the calculation of the fiscal result in the following forms:

- an additional deduction, 50% of the eligible expenses for these activities, deduction used to establish the fiscal result;
- the application of the accelerated depreciation method for the apparatus and equipment intended for RDI activities
- exemption for the payment of income tax for natural persons, but for incomes of the nature of salaries and similar to them obtained for the conduct of research activities - applied development and experimental development defined by legislation; this regulation is important in the situation where companies carry out research - development activities and in associative forms.
- state aid for supporting research, development and innovation activities according to the state aid scheme regulated by the Order of the Minister of Research, Innovation and Digitization no. 20,827 from June 17, 2022

Also, depending on the development strategies of the RDI field at national and European level (digitalization, for example, which is defined as a strategic objective of European development starting from 2020) companies can benefit from public financial support through grants, subsidized loans and guarantees to loans for the innovative activities they carry out.

With all these facilities, many companies in the country carry out research - development - innovation activities that are not carried out in dedicated organizational structures. These activities can be carried

¹ Government Ordinance no. 57/2002 on scientific research and technological development approved with amendments by Law 324/2003 with subsequent amendments and additions, as well as the system of normative acts associated with the field of research - development - innovation

² Annex to Government Ordinance no. 57/2002 on scientific research and technological development

³ <https://www.research.gov.ro/ro/articol/4481/sistemul-national-de-cercetare>

out without the existence of a specialized organizational structure that has specialized employees, without its own organizational regulation and without distinct accounting and can be found at the level of any field of activity in the company. But, all these activities are aimed at obtaining improvements of some products and/or services, optimization of some processes that are necessary in the company, regardless of the fields of activity in which they take place.

Depending on the scale of the research-development projects to support these activities, the company needs suitable funding sources. These can come from:

- internal financing: from the company's own funds, capital contribution of shareholders (associates), etc.
- external financing of the company: funds from the state budget through various programs oriented towards research, development and innovation (RDI), from projects based on funds of the European Union (through the main Horizon Europe program oriented towards RDI) or of other international financial institutions, from credits, bank loans for different terms, financial and/or operational leasing, bond issuance, etc.

Regarding the funding from the state budget of the research and development activity, it is managed through several instruments: the National Plan for Research, Development and Innovation structured on several programs, sectoral plans, and other plans, programs and research projects which are launched to achieve certain objectives or which are intended for certain categories of researchers. All this is managed by the Ministry of Research, Innovation and Digitization (which coordinates the National Research and Development System) together with the Ministry of Education and Research which, through the Executive Unit for the Financing of Higher Education, Research, Development and Innovation (UEFISCDI), finances approximately 22 % of public funds allocated to research, development and innovation.

Definition of the study

In order to obtain a more comprehensive picture of the research and development activity within the companies in Bihor county, we will carry out a quantitative research by means of a survey based on a questionnaire. It is made up of topics that will analyze elements related to: the definition of the company, the types of research and development - innovation, research and development expenses - development and innovation, personnel involved and results) and contains 15 questions with closed and open answers. The scope of the research is represented by industrial companies from Bihor, regardless of their field of activity. The analyzed sample will consist of industrial production companies from the industrial parks of the city of Oradea as well as from other localities that have such companies: Alesd, Beiuș, Ștei, Marghita, etc. The questionnaire will be administered directly to company representatives, online or on-site. The collected data will then be centralized, processed and compared with national statistical data (obtained by the National Institute of Statistics through CD-BES and INOV statistical research) and European - results from the European innovation scoreboard (EIS) and from the Community Innovation Survey (CIS).

Following the centralization of the data of this study, it will be possible to create business models oriented towards innovation and the implementation of its results in all areas of the company's activity. The structure of the questionnaire is presented below. It should be noted that for its administration, we use a detailed form that contains a series of specifications that allow the unitary interpretation of the requested data.

The questionnaire is designed as follows:

1. Please specify the type of your company on Dec. 31. 2021:

A. Resident enterprise	Yes <input type="checkbox"/>	No <input type="checkbox"/>
B. Multinational company		
<i>B.1. controlled from Romania</i>	Yes <input type="checkbox"/>	No <input type="checkbox"/>
<i>B.2. controlled from the outside</i>	Yes <input type="checkbox"/>	No <input type="checkbox"/>

2. What is the main activity of your company?
specify _____

2. In 2021, did your company carry out research and development activity within a research and development department or a research and development team?
 Yes No

3. Please specify what was the distribution of R&D expenses from the total research and development expenses in 2021, depending on the type of R&D

	% in total expenses R-D	of which: in the R-D department
Basic research		
Applied research		
Experimental development		

4. For 2021, what is the method of covering total R-D expenses depending on the source of funding

	Funding source	%
1	Întreprinderi cu activitate economică, din care:	
1.1	<i>company's own sources (microproduction/services, etc.)</i>	
1.2	<i>enterprises (units) belonging to the same group</i>	
1.3	<i>other enterprises (units)</i>	
2	Public funds	
3	Higher education units	
4	Private non-profit organizations	
5	From abroad, from which:	
5.1	<i>from the European Community</i>	
6	Other sources (including loans)	
	Total funding sources	100

5. What is the value of the ratio between the total R-D expenses and the total number of employees in your company? But the value of the ratio between total R-D expenses and the number of employees involved in research and development activities?

	Ratio lei/employee	out of which: in the department of R-D lei/employee
Ratio of total R-D expenses and total number of employees (full-time)		
Total R-D expenditure ratio and number of R-D employees (full-time)		

6. On December 31, 2021, what is the share of employees involved in research - development activities in the total number of employees of your company?
 Write the weight here _____

7. In 2021, what was the distribution of staff involved in research and development activities, by occupation, in full-time equivalent?

		No. full-time equivalent staff FTE*	From which: Female
1	Researchers		
1.1	out of which: internal staff		
2	Technicians and assimilated		
2.1	out of which: internal staff		
3	Other categories of staff		
3.1	put of which: internal staff		
4	Total number of people		
4.1	out of which: internal staff		

8. For the next 3 years, 2022 – 2025, do you intend to carry out research - development activities?

	Yes	No
Basic research		
Applied research		
Experimental development		

9. In 2021, did your company launch new or improved products (goods or services)?

	YES	NO
New on the market (Not previously offered by any of your competitors)		
New for the company (Identical or very similar to products already offered by your competitors)		

10. In 2021, for which of the following innovations in your company new products/services, business, marketing or organizational processes were created or existing ones were improved?

	Yes	No
Methods of producing or developing goods or providing services	<input type="checkbox"/>	<input type="checkbox"/>
Logistics, delivery or distribution methods	<input type="checkbox"/>	<input type="checkbox"/>
Information processing or communication methods	<input type="checkbox"/>	<input type="checkbox"/>
Accounting methods or other administrative operations	<input type="checkbox"/>	<input type="checkbox"/>
Business practices for organizing procedures or external relations	<input type="checkbox"/>	<input type="checkbox"/>
Methods of organizing workplace responsibility, decision-making or human resource management	<input type="checkbox"/>	<input type="checkbox"/>
Marketing methods for promotion, packaging, pricing, product placement or after-sales service*	<input type="checkbox"/>	<input type="checkbox"/>

11. Which of the following types of innovative research and development activities were carried out by your company in 2021?

	Yes	No
1. Internal research and development (R&D) activities	<input type="checkbox"/>	<input type="checkbox"/>
If YES, in what way?		
1.1 <u>Continuously</u> <i>(the enterprise had its own permanent R-D staff)</i>	<input type="checkbox"/>	<input type="checkbox"/>
1.2 <u>Occasionally</u> <i>(the enterprise had R-D staff only when needed)</i>	<input type="checkbox"/>	<input type="checkbox"/>
2. External research and development activities subcontracted to other enterprises (including enterprises of the same group) or with public or private research organizations	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>

12. What types of tax facilities have you obtained for carrying out research and development activities in 2021?

		Yes	No
1.	Incentives granted for the calculation of the fiscal result through the additional deduction (in the proportion of 50%) of the eligible expenses	<input type="checkbox"/>	<input type="checkbox"/>
2.	Incentives granted for the calculation of the fiscal result by applying the accelerated depreciation method for apparatus and equipment intended for RDI activities	<input type="checkbox"/>	<input type="checkbox"/>
3.	Exemption for the payment of income tax for natural persons but for incomes of the nature of salaries and similar to them obtained for the conduct of research activities - applied development and experimental development	<input type="checkbox"/>	<input type="checkbox"/>
4.	Public financial support through grants, subsidized loans and loan guarantees		
4.1	Local or regional authorities	<input type="checkbox"/>	<input type="checkbox"/>
4.2	Government	<input type="checkbox"/>	<input type="checkbox"/>
4.3	The EU program Horizon 2020 or Horizon Europe	<input type="checkbox"/>	<input type="checkbox"/>
4.4	Other financial support from EU institutions	<input type="checkbox"/>	<input type="checkbox"/>
5.	Other forms, list: _____		

13. In 2021, your company requested:

		YES	NO
1.	Registration and application for a <u>patent</u>	<input type="checkbox"/>	<input type="checkbox"/>
2.	Application for registration of an <u>industrial design</u>	<input type="checkbox"/>	<input type="checkbox"/>
3.	Application for registration of a <u>manufacturing mark</u>	<input type="checkbox"/>	<input type="checkbox"/>
4.	<u>Copyright</u> claim	<input type="checkbox"/>	<input type="checkbox"/>
5.	Use of <u>trade secrets*</u> in product manufacturing	<input type="checkbox"/>	<input type="checkbox"/>
6.	Application for using a <u>utility model</u>	<input type="checkbox"/>	<input type="checkbox"/>

14. In your company, do innovative activities take place outside the specialized research-development department?

Yes No

15. What types of innovations are carried out in your company?

		Yes	No
1.	Product innovations	<input type="checkbox"/>	<input type="checkbox"/>
2.	Process innovations	<input type="checkbox"/>	<input type="checkbox"/>
3.	Marketing innovations	<input type="checkbox"/>	<input type="checkbox"/>
4.	Organizational innovations	<input type="checkbox"/>	<input type="checkbox"/>

16. Evaluate and/or estimate the completion mode of innovative activities that did not have the results listed in question 14

		Yes	No
1.	Innovative activities not completed in 2021 but <u>ongoing</u> by the end of 2022	<input type="checkbox"/>	<input type="checkbox"/>
2.	Innovation activities <u>abandoned</u> in 2021	<input type="checkbox"/>	<input type="checkbox"/>
3.	Innovation activities <u>suspended</u> in 2021 but with the potential to resume them in the following period	<input type="checkbox"/>	<input type="checkbox"/>
4.	Innovation activities completed but not applied in 2021	<input type="checkbox"/>	<input type="checkbox"/>

17. Compared to the years before the covid 19 pandemic, how were research and development activities influenced?

		Yes	No
1.	Budgets for such activities have been cut	<input type="checkbox"/>	<input type="checkbox"/>
2.	Research and development budgets have been increased	<input type="checkbox"/>	<input type="checkbox"/>
3.	Work procedures have been modified to facilitate/stimulate research and development activities	<input type="checkbox"/>	<input type="checkbox"/>
4.	Procedures were imposed to make the way of working (remote) more flexible for the staff involved in these activities	<input type="checkbox"/>	<input type="checkbox"/>
5.	Digitization elements of these activities have been introduced	<input type="checkbox"/>	<input type="checkbox"/>
6.	Other forms; list: _____		

18. Compared to the years before the covid 19 pandemic, how were the innovative activities carried out in the company, other than research and development, influenced?

		Yes	No
1.	Budgets for such activities have been cut	<input type="checkbox"/>	<input type="checkbox"/>
2.	Budgets have been increased to stimulate innovation of all kinds	<input type="checkbox"/>	<input type="checkbox"/>
3.	Work procedures have been modified to facilitate/stimulate innovative activities	<input type="checkbox"/>	<input type="checkbox"/>
4.	Procedures were imposed to make the way of working (remote) more flexible for the staff involved in these activities	<input type="checkbox"/>	<input type="checkbox"/>
5.	Digitization elements of these activities have been introduced	<input type="checkbox"/>	<input type="checkbox"/>
6.	Other forms; list: _____		

19. In the following period, until the end of 2022, will you introduce operational, procedural, managerial, etc. measures for innovative, research and development activities that will lead to their stimulation and the legal registration of their results?

Yes No

Conclusions

In an economic environment with accelerated dynamics and in the conditions of the emergence of disruptive factors with major effects, as in recent years the COVID-19 pandemic and the war in Ukraine have been, it is essential that companies adapt to face these challenges .

Whether it is integrated into the production activity, or a separate structure is created with a name and function adapted to the specific needs of the firm, research, development and innovation are gaining importance.

Research-development and innovation activity in companies must be boosted, a fact also provided for by European directives, in this sense a closer collaboration between research institutions, universities and companies is necessary, as the main element of generating added value in society.

The present work represents a first stage of a larger study regarding the research, development, innovation activities carried out in the companies of Bihor county in the post-pandemic reality. This will be continued by applying the designed questionnaire, centralizing and processing the data, establishing the existing results at the time of application and determining practical ways to stimulate these types of activities. The proposals will be sent to the companies participating in the study to be analyzed and possibly applied.

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CONSUMER'S BEHAVIOR STUDY OF ORGANIC PRODUCTS IN THE POST-PANDEMIC PERIOD

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Abstract

Purpose – *Informing and documenting the psychological profile of the consumer of organic products.*

Methodology/approach – *The research method used is the survey, and the research tool used is the questionnaire applied to each subject.*

Findings – *The Internet is the primary source of information regarding purchases, for both organic and traditional products. Although the term organic can be assimilated with a multitude of specifications, the subjects associate organic products with healthy products. The consumers of these products are satisfied with the characteristics, the benefits brought, but also with their price. Although they are more expensive, the subjects are willing to spend a significant amount every month.*

Research limitations/implications – *The questioned subjects refer to a general context of organic products, the range of food and non-food products being very wide.*

Practical implications – *Applying research tools every 6 months would be effective to see how the consumers situation of organic products has changed, taking into account that lifestyle variables are not constant and they change over time. A longitudinal study would allow observing changes in consumer preferences over time.*

Originality/value – *Green marketing aims not only to sell or win long-term customers, but to create a better world by offering green products. The consumption of these products increases the quality of life and contributes to supporting the environment.*

Key words: *post-pandemic consumer behavior, organic products, ecological marketing*

Introduction

Green marketing aims not only to sell or gain long-term customers, but more than that, to create a better world by offering products that support and improve the environment.

In order to understand and achieve this, it is necessary for organizations to know the ecology of the market, namely the laws and the current production and consumption systems, and then with the help of this knowledge certain policies are established that oversee the efficient use of the resources used, as well as the processes utilized. Organizations should use coherent and solid green marketing strategies that look not only at advertising communication, but also at the production process, from the use of raw materials, to the creation of packaging and disposal of waste.

The demand for organic products has increased, and the pandemic period has accelerated this trend, which is continuously growing even in the post-pandemic period.

In the post-pandemic period, the evolution of the consumer goods market reflects the habits during the pandemic era regarding the consumption of organic products, either food or non-food, which led to increased sales.

In this paper, a marketing research was carried out regarding the use of organic products also in the post-pandemic period, with the aim of providing as much information as possible about consumers, specifically about their opinions, attitude and behavior.

Although consumers are increasingly attentive to the use of materials or ingredients and to the production processes that are more or less sustainable, often they do not have much specific knowledge on this topic, thus the sphere of information becomes an extremely important factor considering the multitude of erroneous information given by some organizations that do not behave properly towards the environment.

Conceptual Aspects Specific to Marketing Research

In order to implement and design the best marketing strategies, knowing the market, the consumer behaviors and their opinions is vital. Marketers pay attention to both the people who buy, use and consume the products or services and also to the factors that can influence the purchase and consumption [Cătoiu, I., Marketing research - treaty, Publisher Uranus, Bucharest, 2009].

In essence, the American Marketing Association defines marketing research as the systematic collection, recording, storage, and examination of data on aspects related to the marketing of goods and services.

The father of marketing, Philip Kotler defines marketing research as "the systematic design, collection, analysis and reporting of data and conclusions regarding a situation that the company faces in the market" [Laura Bacali (coordinator) – Manual of Economic Engineering, Marketing, Publisher "Dacia",2002].

The mission of market research is to strengthen the marketing decision.

Market research seeks and elaborates answers to one or almost all of the essential questions presented in figure 1. intended for a marketing situation.

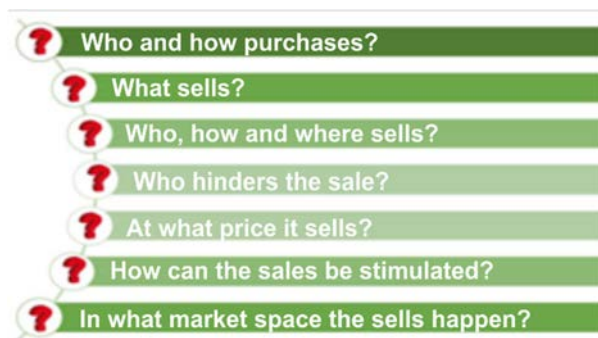


Figure 1. Essential questions of market research

[Gabriel-Petru Luca, Laura Bacali – Management of Ecologic Marketing, Publisher " Gh. Asachi", Iași, 2003]

The functions of marketing research can be summarized as:

- the descriptive function, which consists in the research and presentation of reality, of the existing state in essence;
- the diagnostic function, which consists in explaining reality;
- the predictive function, which consists in predicting the results, effects following marketing decisions, based on descriptive research and diagnostics;
- the projective function, which involves supporting the development of a long-term strategy, by increasing the company's active mission in relation to environmental changes, based on the optimal allocation of resources, i.e. by supporting the company to follow an anticipatory-active attitude on the market.

Summarizing the above, research is the function of marketing that with the help of information connects the customer, the consumer and the general public to the marketer.

Marketing research covers a multitude of areas, such as: analysis of market characteristics, allowance of potential market and its evolution, sales analysis, market segmentation studies, sales forecasting, price related studies, product image research, evaluation of sales methods, testing marketing programs,

products and packaging, analysis of direct and indirect competitors [Gabriel-Petru Luca, Laura Bacali – Management of Ecologic Marketing, Publisher “ Gh. Asachi”, Iași, 2003]

Objectives of marketing research:

- knowing the environment in which the organization operates;
 - identify the organization's opportunities on the respective market;
 - determine the action alternatives for the respective organization;
 - choose an optimal version from those alternatives
- [<https://www.studocu.com/ro/document/academia-de-studii-economice-din-bucuresti/cercetari-de-marketing> (accessed on 15.05.2022)].

The multitude of relationships the organizations have with the environment generates a variety of themes for marketing research. Grouping them based on categories of research activities includes the following:

- researches at micro and macro-economic level;
- price research;
- distribution research;
- product research
- research on promotion;
- purchasing behavior research [Laura Bacali (coordinator) – Manual of Economic Engineering, Marketing, Publisher “Dacia”,2002].

The complexity of processes and phenomena targeted by marketing research involves numerous ways of studying them. Thus, numerous research variants were developed which were included in certain criteria that form the typology of marketing research, presented in figure 2. below.

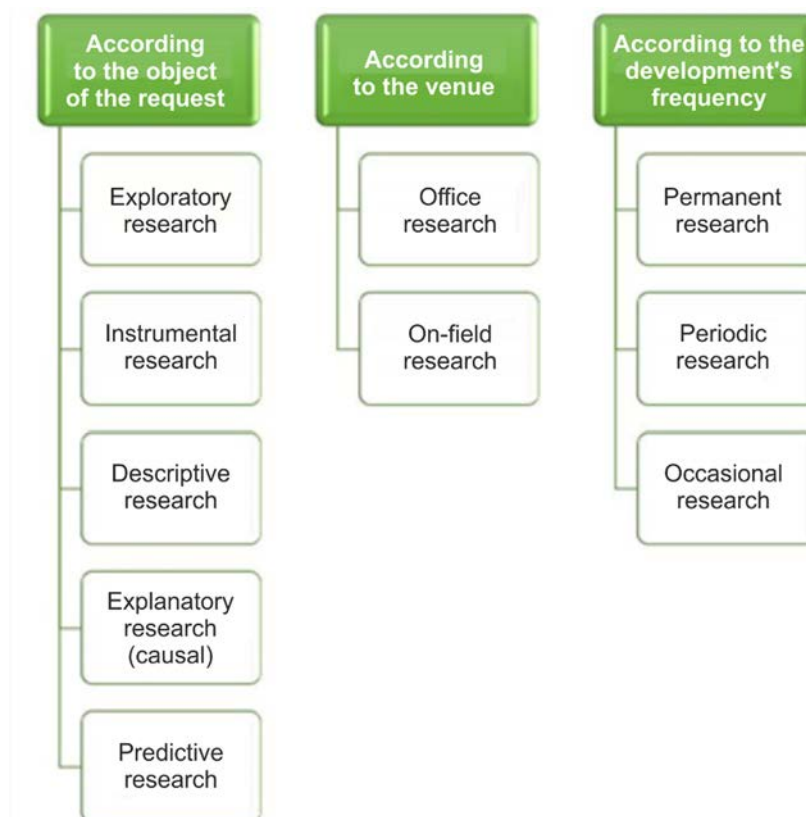


Figure 2. Typology of marketing research [Gabriel-Petru Luca, Laura Bacali – Management of Ecologic Marketing, Publisher “ Gh. Asachi”, Iași, 2003]

Exploratory research has the role of clarifying aspects related to problems faced by decision-makers, while descriptive research has the objective of describing the marketing phenomena that takes place and determining their frequency of occurrence.

Instrumental research is intended for testing and validating some research tools or methods, such as the questionnaire, while causal research has the role of identifying and knowing the relationships between variables. Predictive research aims to make a forecast of marketing phenomena, on different terms (short, medium, long).

Office research has as information reports, statistics, which can be easily obtained and studied in the office, while onsite research involves the travel of the researcher to the source.

Regarding the frequency of conducting research, it can be periodic, when it is carried out at certain time intervals, and occasional, when it is no longer repeated in time [<https://www.studocu.com/ro/document/academia-de-studii-economice-din-bucuresti/cercetari-de-marketing-cercetari-de-marketing/continutul-si-sfera-cercetarii-de-marketing/2310040> (accessed on 16.05.2022)].

Marketing Research Process

Based on a multilateral analysis, a marketing research can be established through the process of grounding and adopting some decisions. For the successful conduct of a marketing research, the following steps are taken:

- Preliminary investigation;
- Elaboration of the research program;
- Collection of data and information;
- Information analysis;
- Writing and presenting the research report [Laura Bacali (coordinator) – Manual of Economic Engineering, Marketing, Publisher “Dacia”,2002].

Preliminary Investigation

The preliminary investigation is the initial phase of the investigation. This stage aims to identify the problem, define the purpose of the research, develop working hypotheses and anticipate the value of the information obtained through the research.

Identifying the problem and defining the purpose of the research are important stages in the research process and have a determining influence on the other phases or stages.

In the present paper, a marketing research was carried out in order to know people's perception for both food and non-food organic products.

Formulating the objectives and hypotheses is an equally important stage, with a direct impact on the research methodology and its costs.

By formulating the objectives it is possible to specify what information is needed regarding the grounding of decisional alternatives for any problem investigated.

The main objective of the research is to identify the opinions of the subjects towards organic products. As secondary objectives, we aim to obtain: information on the frequency of purchasing organic products, the type of organic products purchased, the level of satisfaction following the purchase and also the evaluation of their price.

The assumptions underlying the research and the elaborated questionnaire are:

1. The majority of respondents use the Internet as their main source of information when shopping in general.
2. All respondents know the term of organic product.

3. A large part of respondents believe that the advantage of organic products is that they are healthier than the classical ones.
4. More than half of the respondents associate organic products to healthy products.
5. The majority of respondents consider organic products to be trustworthy due to the advantages they offer.
6. Most respondents have purchased organic products at least once.
7. Respondents decide which organic products to buy by getting information from friends and family.
8. Half of the respondents have a high degree of satisfaction with organic products.
9. A large part of the respondents consider that the price of organic products corresponds to their value.
10. More than half of the respondents allocate, on average, a maximum of 10% of their income for the consumption of organic products monthly.
11. Most of the respondents have bought organic food products up to now.
12. A large part of the respondents believe that in the future they will purchase organic products.

Research Program Development

In developing the research program, the survey method was used, we developed a questionnaire that was then distributed on online platforms and was applied to each subject.

The questionnaire was built according to the funnel principle, from general questions to specific ones. It contained both closed-ended, dichotomous, multichotomous, scaled responses and open-ended, completely unstructured questions and was pretested on a sample of 10 subjects, who were not subsequently included in the final sample. Following the pretest, the necessary changes were made to the questions, as well as the answers, and then the questionnaire was drafted in its final form.

A non-random research method, based on accessibility, was used for the selection of subjects.

The final sampling includes 70 subjects, natural persons, of which 44.3% are male and 55.7% are female, belonging to both urban and rural environments, some with secondary education and others with higher education.

Data and Information Analysis

At this stage, the results obtained from the research are presented descriptively and also in graphic form.

At the first question of the completed questionnaire, the respondents specified the sources of information in relation to the products they purchase, the results being concretized according to the following graph:

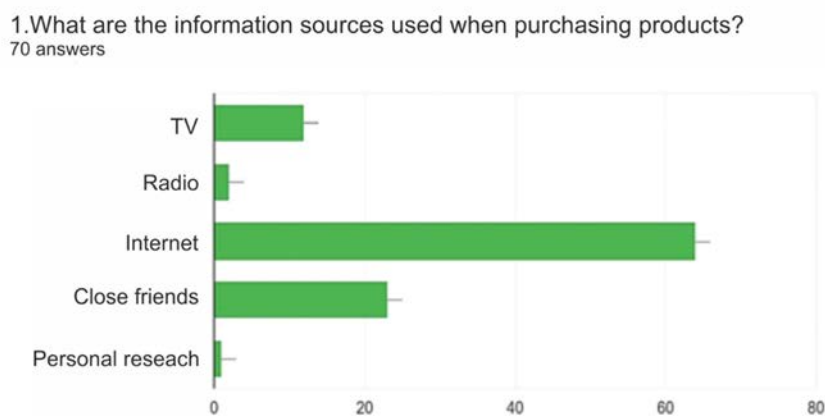


Figure 3. Sources of information related to purchased products

By summarizing the responses recorded to this question, the main statements of the subjects are identified. In this situation, the answers were inserted into the Excel application, where they were centralized, and the below graph was generated.

The results indicate a percentage of 29% where the subjects declared that the advantage of organic products compared to classic ones is that they are healthier. 13% of subjects believe that organic products reduce pollution, 11% believe that they have a higher quality, 8% that they protect the environment, 6% believe that they are better, and 5% believe that organic products are more natural. With a percentages of 2%, the subjects believe that organic products help the ecosystem and are not harmful to the planet, have nutritional values, do not contain pesticides, herbicides, hormones, genetically modified organisms and additives, have a lower carbon footprint than classic ones and have a composition without additives and preservatives. There was also a percentage of 3% which considered that organic products have no advantage over conventional products.

The hypothesis behind this question "A large part of the respondents believe that the advantage of organic products compared to conventional ones is that they are healthier." it is confirmed at the level of the investigated sample.

Next, we wanted to know the respondents' perception of the organic product.

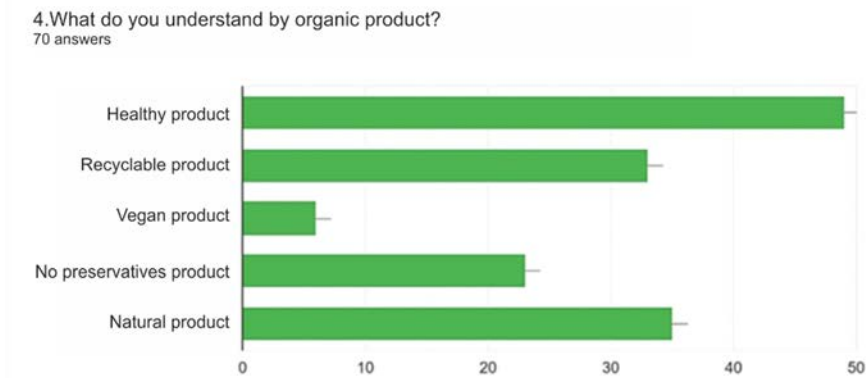


Figure 6. Organic product's significance

According to the results obtained, following the analysis, it can be observed that the highest value was obtained by the characteristic "Healthy product", with a percentage of 70%, meaning 49 of the total respondents. Also, a large part of the respondents, 50%, representing a number of 35 subjects, consider that the organic product is equivalent to the natural product, 47.1% to the recyclable product, 32.9% to a product without preservatives, and in a lower percentage, of 8.6% to the vegetable product.

The hypothesis "More than half of the respondents believe that organic products are equivalent to healthy products" is confirmed.

In the following, we wanted to identify the credibility of the organic products's advantages for the subjects.

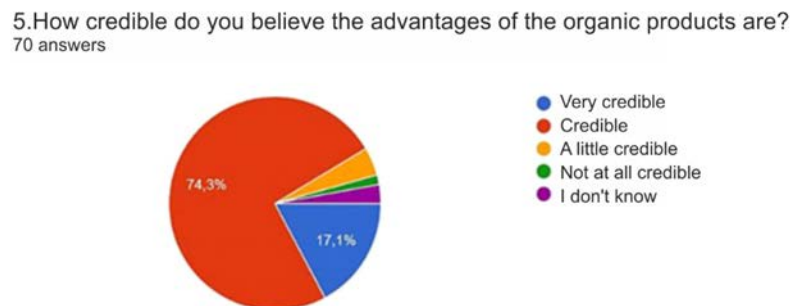


Figure 7. Credibility of the organic products's advantages for the subjects.

According to the above graph, a percentage of 40.7%, meaning 24 of respondents, consider the advantages of organic products to be credible, and 17.1% consider their advantages to be very credible. The other variants are found in smaller proportions: 4.3%, in the number of three subjects, those who consider them less credible, 2.9% those who do not know this aspect and 1.4%, a percentage represented by a single subject, those who consider the advantages of organic products to be at all credible. Hypothesis "Most respondents consider organic products to be credible." it is confirmed at the level of the investigated sample.

The following question analyzes the percentage of subjects who have ever purchased organic products.

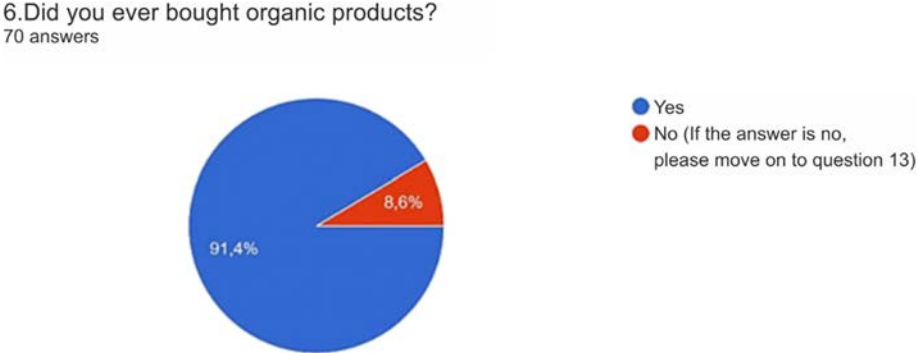


Figure 8. Subjects affirmation in regards to purchasing organic products

The majority, 91.4%, meaning 64 subjects claim to have purchased organic products. On the other hand, 8.6%, meaning 6 subjects state that they have never purchased organic products. Following the results obtained, the hypothesis "Most respondents have purchased organic products at least once" is confirmed.

Further on, we will investigate the sources of information used by the subjects when deciding which organic products to purchase.

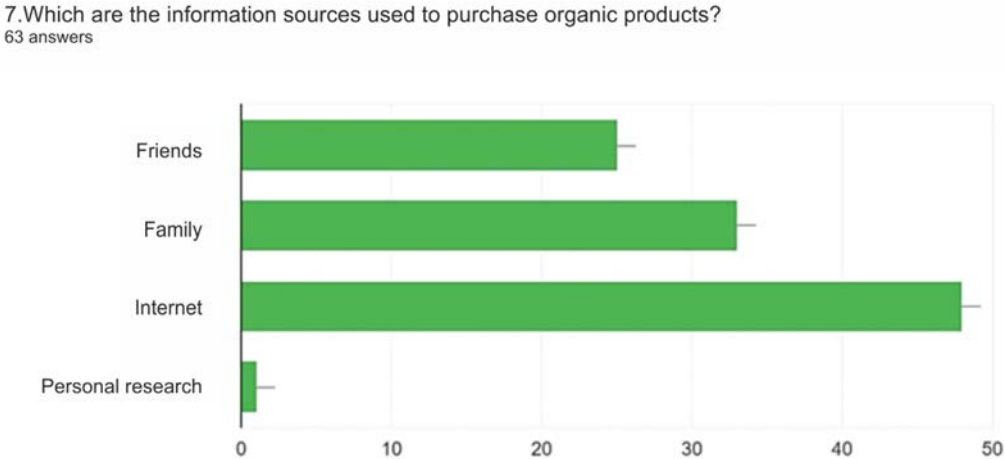


Figure 9. Sources of information used when purchasing organic products

Summarizing the responses recorded to this question, it appears that the majority of respondents, representing 76.2% of the total percentage of 100%, purchase products using the Internet as a source of information. 52.4% of the respondents get information through family, and 39.7% through friends. In addition to the answer options presented in the questionnaire, one respondent states that he relies on his own knowledge when purchasing organic products.

Thus, the hypothesis corresponding to this question "Respondents decide which organic products to buy by getting information from friends and family" is disproved at the level of the investigated sample, because the Internet is the predominant source of information chosen by the subjects.

The purpose of the eight question is to identify the degree of satisfaction of the respondents towards the organic products bought.

8. On a scale from 1 to 5, in which 1 is the lowest and 5 is the highest, what is the satisfaction level towards the purchased organic products?

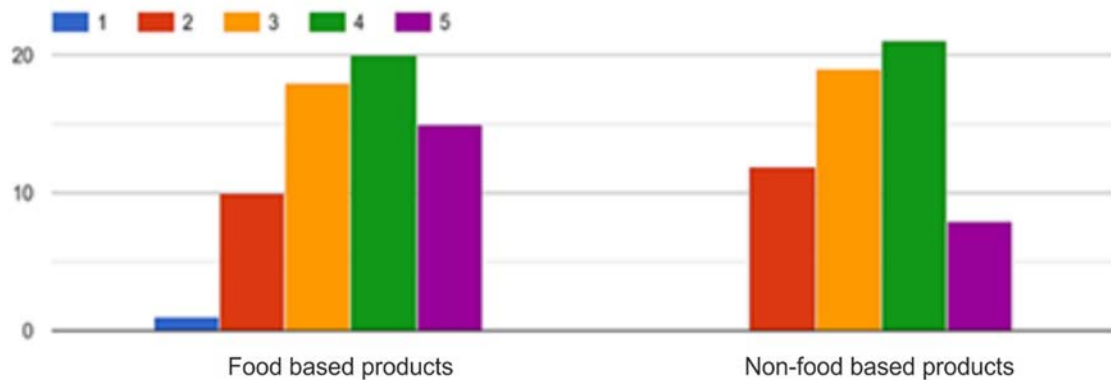


Figure 10. The satisfaction level provided by the purchased organic products

We analyzed the purchasing situation of both food and non-food products.

Regarding the food products, most of the respondents have a high degree of satisfaction with the organic products bought, 20 respondents choosing criterion 4 from the graph. A number of 18 respondents have an average degree of satisfaction, opting for criterion number 3 in the graph, and at a small difference, with a number of 15 respondents, there is criterion number 5 which represents a very high degree of satisfaction with the food based organic products bought. On the other hand, in the graph analyzed, there are also respondents who are less satisfied with the purchased organic products, 10 and respectively one respondent with low and very low degree of satisfaction, represented by criterion 1 and 2 in the graph.

Regarding non-food products, the situation is opposite to food products. The maximum degree of satisfaction being the lowest percentage in the graph, selected by 8 subjects. It is noted that 21 subjects have a high degree of satisfaction with the non-food products purchased, 19 subjects have an average degree of satisfaction, and 12 subjects have a low degree of satisfaction.

The hypothesis that was the basis of this question "Half of the respondents have a high degree of satisfaction with organic products." is confirmed.

Through the following question, respondents had the opportunity to express their opinion with regards to the price of organic products compared to classic ones.

9. What do you think of the price of organic products compared to classic ones?
64 answers

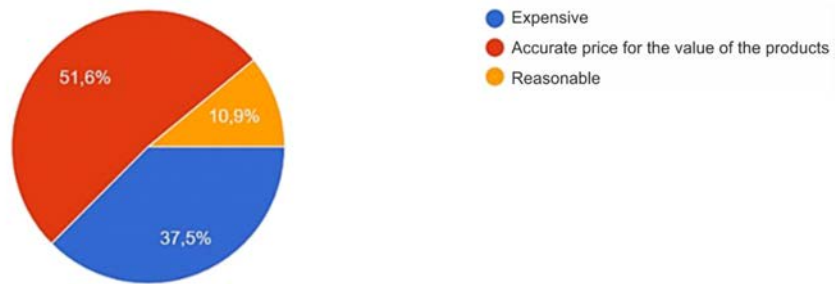


Figure 11. Subjects' view in regards to the price of organic products compared to classic ones

Following the graph's analysis, it is noted that more than half of the respondents believe that the price of organic products compared to the classic ones corresponds to their value, as a majority, with a percentage of 51.6%. A number of 24 respondents believe that the price of organic products is too high compared to that of classic products, and 7 respondents think that organic products have an acceptable price.

Hypothesis "A large part of the respondents believe that the price of organic products corresponds to their value." is confirmed.

The next question has a close connection with the previous one, thereby wanting to find out the subjects' opinion regarding the price given to organic products in accordance with their value.

10. Do you believe the price of organic products matches their value?
64 answers

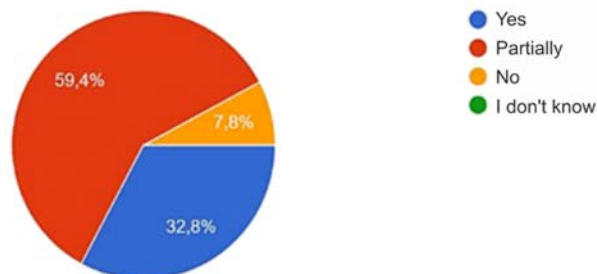


Figure 12. Subjects' opinion on the price and value of organic products

According to the above graph, a share of 59.4%, meaning 38 respondents out of 70, consider that the price of organic products is partially appropriate to their value, 32.8% consider that the price of organic products is entirely appropriate to their value, and 7.8% believe that the price of organic products does not correspond to their value.

The hypothesis that was the basis of this question was confirmed at the level of the investigated sample: "A large part of the respondents believe that the price of organic products corresponds to their value".

Next, we wanted to identify the percentage of income that the respondents are willing to allocate monthly for the consumption of organic products.

11. How much money are you willing to spend on average, monthly, for purchasing organic products?
64 answers

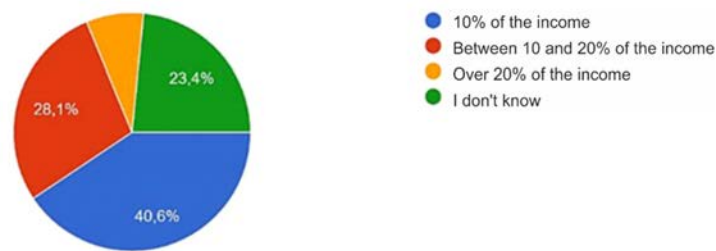


Figure 13. The monthly percentage allocated for the consumption of organic products

The results shown in figure 13. reveal a share of 40.6% of the investigated subjects who allocate an average of 10% of their income monthly for the consumption of organic products, this being the predominant percentage in the graph. With a percentages of 28.1% subjects are willing to allocate between 10 and 20% of their income, 7.8%, meaning a number of 8 respondents are willing to spend more than 20% of their income, and 15 of them (23, 4%) do not know the percentage they are willing to allocate on average monthly for the consumption of organic products.

The hypothesis behind this question "More than half of the respondents allocate on average a maximum of 10% of their income per month for the consumption of organic products." is refuted, because only 40.6% of the respondents allocate 10% of the income, while the rest spend above the average formulated in the hypothesis.

Considering the diversity with which organic products have evolved in general, the following question wanted to know the types of products purchased most often.

12. What type of organic products you purchased?
64 answers

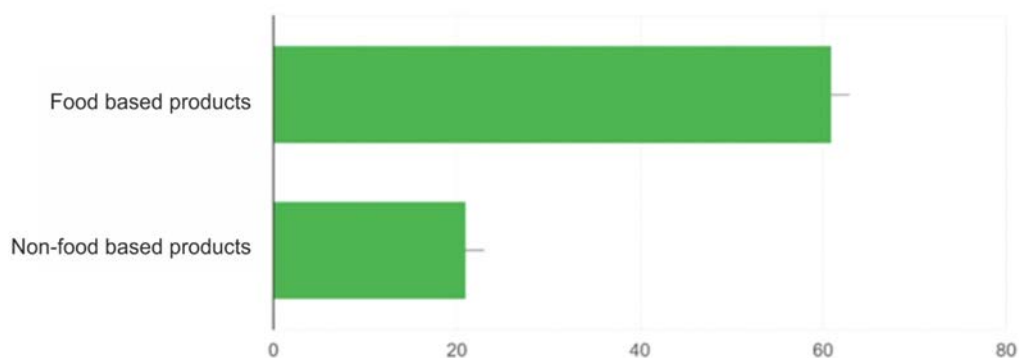


Figure 14. Type of organic products purchased

Following the analysis of the above graph, it is found that food based products are predominantly bought by the respondents, the graph showing a percentage of 95.3%, meaning a number of 61 subjects in the case of this variant, and in the case of non-food products, a percentage of 32.8%, meaning a number of 21 subjects.

The hypothesis behind this question "The majority of respondents have bought organic food products so far." is confirmed.

Question number 13 is identified as a complicated question, a control question, concerning the attitude, motivation and opinion of subjects. Within this, it is desired to identify the subjects' intentions towards the purchase of organic products in the future.

13. Do you believe you will purchase organic products in the future?
70 answers

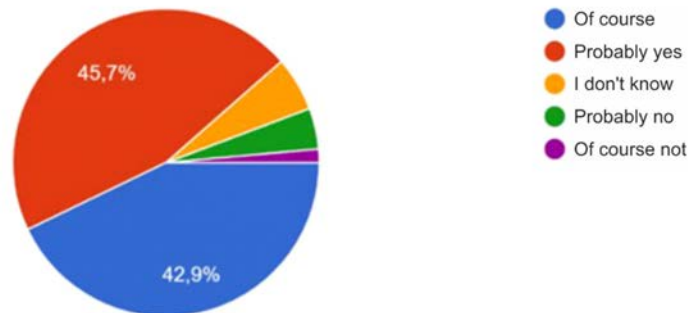


Figure 15. Subjects' intentions towards the purchase of organic products in the future

According to the graph, most respondents want to purchase organic products in the future, 42.9% answering "Definitely yes", and 45.7% answering "Probably yes". In smaller proportions, 4.3% probably wouldn't buy and 1.4% definitely wouldn't buy, and 5.7% of them don't know.

Thus, the hypothesis corresponding to this question "A large part of the respondents believe that in the future they will be purchasing organic products" is confirmed at the level of the investigated sample.

According to the principle to which the questionnaire was built, the "funnel principle", after the general questions follow the specific or identification questions, which served for analyzing the responses in the questionnaire, under the protection of anonymity.

The first identifying question is related to the age of the subjects. Thus, according to the results, of the total of 70 respondents, 77.1% are between 18-35 years old, 14.3% are over 45 years old, and then, equally, with a percentage of 4, 3% are respondents aged between 35-45 and those under 18.

14. age
70 answers

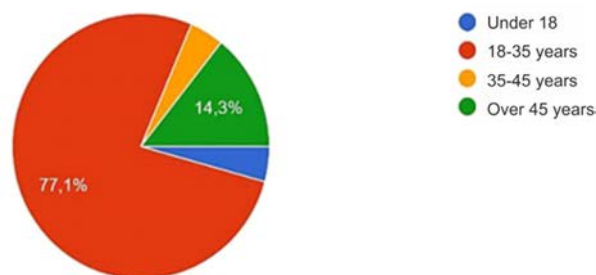


Figure 16. Subjects' distribution according to age

Next question corresponds to the level of education of the respondents.

According to the results illustrated in the below graph, the majority of the subjects (57.1%), meaning 40 people out of the total of 70, have university degrees. A share of 22.9% consisting of 16 subjects have high school education, 10%, registering 7 respondents, have university education, 5.7% have secondary school education, and finally, with equal percentages of 1.4% have post-high school education and professional.

15. Educational degree
70 answers

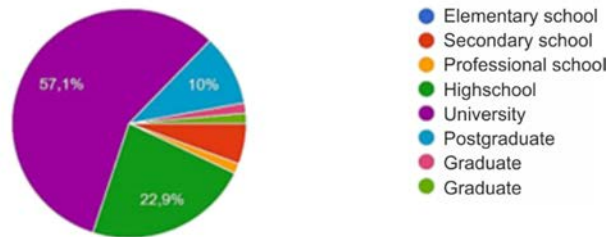


Figure 17. Subjects' distribution according to educational level

Through this question, the demographic data of the subjects needed for the statistical analysis of the data was analyzed. It is noted that more than half live in urban areas (55.7%) and 31 of them (44.3%) in rural areas.

16. Living area
70 answers

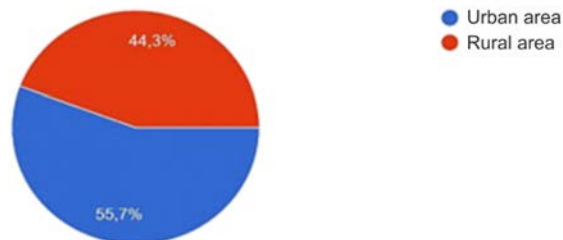


Figure 18. Subjects' distribution according to living area

Question number 17 was ment to investigate the gender of the persons involved in the survey. Thus, the results show that the female part is predominant with a percentage of 55.7%, meaning 39 people out of the total of 70, and the male part represents 44.3%, meaning 31 respondents.

17. Gender
70 answers

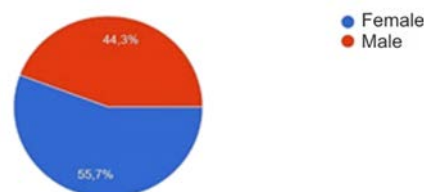


Figure 19. Subjects' distribution according to gender

Finally, the surveyors wanted to identify the average monthly net income per family member of the investigated subjects. The results illustrated in figure 20 show that 28 people out of a total of 70, representing 40%, have an income between 2000 and 4000 lei. In a share of 27.1%, 19 people have an income between 1000-2000 lei, 21.4% below 1000 lei, and the remaining 11.4% of the total respondents, meaning 8 people, benefit from an average income over 4000 lei monthly.

18. The average monthly net income per family member
70 answers

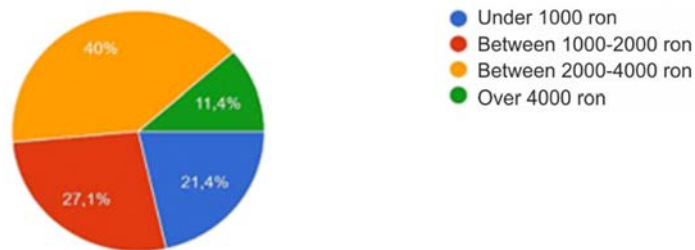


Figure 20. Subjects' distribution according to the average monthly net income per family member

Conclusions

A company's image plays an important role in its development, thus in order to increase its degree of appreciation among the public, but also of the market on which it operates, companies turn to organic marketing.

Green marketing, an integral part of social marketing that seeks to satisfy consumers' needs to a greater degree than competitors, while enhancing their well-being and the environment in which they live, proposes a set of product, prices, promotions, and distribution policies that can ensure and maintain a cleaner environment and healthier consumption to maximize the quality of life.

An important role in buying organic products is to inform consumers about healthy food, care for the environment, awareness of using resources rationally and living in harmony with the environment.

The study resulted in information regarding the psychological profile of the organic products consumer, discovering a complex outline. The information refers to his opinion on organic products, on the selling price, the frequency of purchasing, the type of organic products consumed as well as on socio-demographics factors.

Based on the answers obtained, the following conclusions were drawn:

The Internet is the main source through which the respondents inform themselves about purchases, whether they are organic or traditional products.

Although the organic term can be assimilated with a multitude of specifications, the surveyed people believe that organic products are associated with healthy products.

From the analysis of the questionnaire, it is acquired that the subjects who are used to purchasing organic products are quite satisfied with their characteristics and the benefits they bring.

A good part of the respondents are satisfied with the price organic products have, considering that it corresponds to the offered value.

Although sometimes organic products can be quite expensive, the respondents are willing to spend a significant part of their monthly salary on purchasing them.

By associating the satisfaction organic products' advantages offer, as well as their price, the subjects believe that they will keep purchasing the products in the future, as well.

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EXPLORING THE COMPETENCIES OF RURAL ENTREPRENEURS: PERSPECTIVES FROM A DEVELOPING COUNTRY CONTEXT

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Abstract

Purpose – This paper aims to investigate current business models and present a conceptual framework based on the results of market research and will present the partial results obtained within the SusRural project that is underway at the Politehnica University of Timisoara and to create a theoretical framework for improving the entrepreneurial skills of individuals.

Methodology/approach – It uses qualitative assessment based on market research. This model captures the most important trends in economic development in rural areas, needs for the training of entrepreneurs, innovation or technology and other peculiarities.

Findings – Entrepreneurial competences must be developed in competence centers for fields of activity and development environments. The research presents the characteristics of the entrepreneurs who established their business during the project.

Research limitations/implications – The entrepreneurial environment is dynamic and encountered both in urban and rural areas. The development of entrepreneurship in rural areas needs to be supported at national and international level.

Practical implications – Social entrepreneurship is a challenge for entrepreneurs because it is not aimed at registering profit through the work they carry out.

Originality/value – The development of entrepreneurship in the rural area is an activity with a major impact in the economy of the future and with many challenges.

Key words: Rural entrepreneurship, business model, entrepreneurial skill.

Introduction

Entrepreneurship is the best way to innovate, create and make an idea become reality and generate profit. Business development in rural areas is a national concern (Cioca et al., 2019). Business models contribute to the development of rural areas. These models generate economic and social value and develop the creativity of the area. Social enterprises and insertion social enterprises respect the principles of the social economy and serve the interest of the community. The principles of the social economy are part of the general objectives of sustainable development (Ambrus et al., 2018). Social entrepreneurship as a peculiarity of entrepreneurship is gaining a lot of interest in the business area. Emphasizing the involvement of the entrepreneur in the social environment and investing profit in the issues of society are dimensions of entrepreneurship in the social economy.

The 21st century brings new challenges, urban population growth, climate change and increasingly limited natural resources are becoming topics of major interest worldwide (Francesco Orsini, 2021). Another concept of the social economy refers to urban agriculture. Urban agriculture, which means growing food in cities, promotes a healthy lifestyle and the involvement of local communities. Identifying the main models of networking and advice to form a significant critical mass of successful entrepreneurs contributing to sustainable rural economic development.

The purpose of this paper is to present the results of a market research that was carried out in 2021 to identify the entrepreneurial training of the target group. The target group consists of 75 potential entrepreneurs. The sample of this research was formed by the target group of the SusRural project

implemented at the Politehnica University of Timisoara. The general objective of this project is to establish 21 social enterprises or social insertion enterprises. The entrepreneurs are from the western part of Romania. These companies will operate for 18 months, to which 6 months of sustainability are added. Each company has at least 5 employees and received a subsidy of 100,000 euros (SusRural website, 2022).

The first part presents the specialized literature in the entrepreneurial field. Then the results of the market research are presented. The next chapter presents different business models in research area. The work ends with the presentation of a model of entrepreneurship in rural areas. The last section presents the conclusions, limitations, and future research directions.

Literature Review

The present world is going through a strong process of urban concentration which causes major changes in production processes, supply chains, adaptation to the new requirements of life. Urban agriculture has been closely linked to the existence of cities (Lawson, L. 2016). Within urban agriculture, the idea of local entrepreneurs who can have production activities in the peri-urban area appears. Urban agriculture is a solution that can be applied individually or organizationally (Harada et al., 2020; Hume et al., 2021).

Although there are currently few studies and research in the field, most agree that this form of agriculture is a modern one and that can co-exist with the urban social environment (Hou, H. 2019). Food and nutritional security, quick and easy access to organic food, short distances in the distribution chain are clear benefits of urban agriculture (Langemeyer, J. 2021).

The development of rural entrepreneurship represents a challenge and an opportunity to contribute to the development of the local economy and the strengthening of the community. As shown in the study (Langemeyer, J. 2021; Cioca et al., 2019), entrepreneurs from different social fields invest resources and complex skills to become competitive. Some costs are lower (for example space rent), but the challenge of the rural environment remains an important component.

The year 2019 introduces a new problem in the food safety equation, the COVID-19 pandemic. The impact that the pandemic has had on the way of supply is major. Strict containment measures to prevent the spread of the virus have prevented the movement of people and goods, affecting especially the supply chain of rural farmers' markets (Pulighe, G. 2020). The potential of urban gardens has been positively highlighted during the pandemic as a quick solution to the restrictive measures taken, but also to the cooperation between urban and rural areas in terms of technologies, capital, and talent (Inwood, S. 2017).

Methodology

The present research uses qualitative research and empirical experience to highlight the results obtained. The target group consists of 75 potential entrepreneurs. Of the 75 responses received, 63 were validated, the rest being incomplete or incorrectly transmitted. For data collection we used a questionnaire that so far has been completed by several 63 people (58.7% female, 41.3 male, Figure 1), 51% from urban areas and 49% from rural areas, Figure 2.

With a higher education level of 48% and a master's degree of 28%, Figure 3. This research is ongoing process, and this paper presents the intermediate results obtained from study.

Age of the sample on which the questionnaire was applied is presented below, Figure 4.

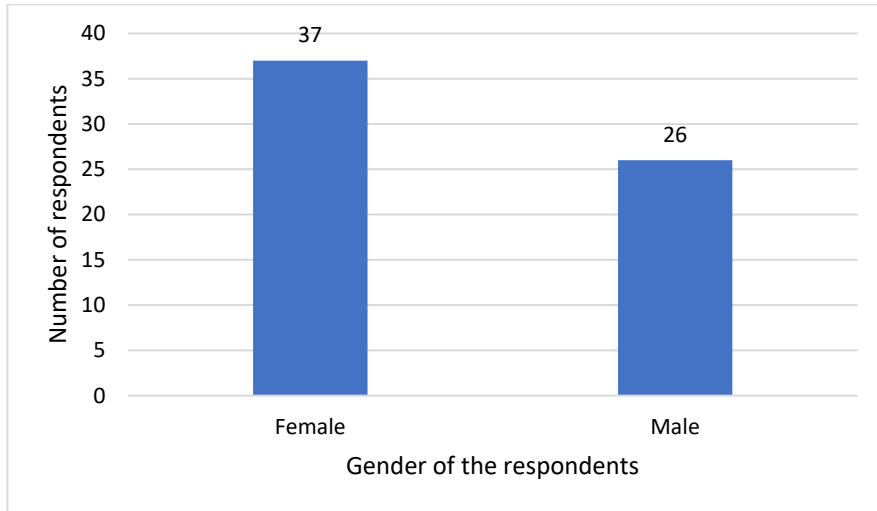


Figure 1. The gender of the respondents

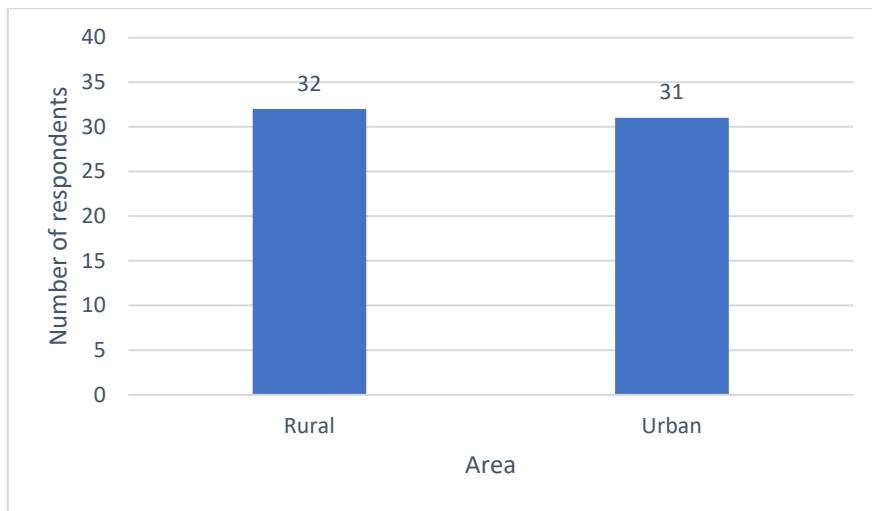


Figure 2. Respondent's living environment

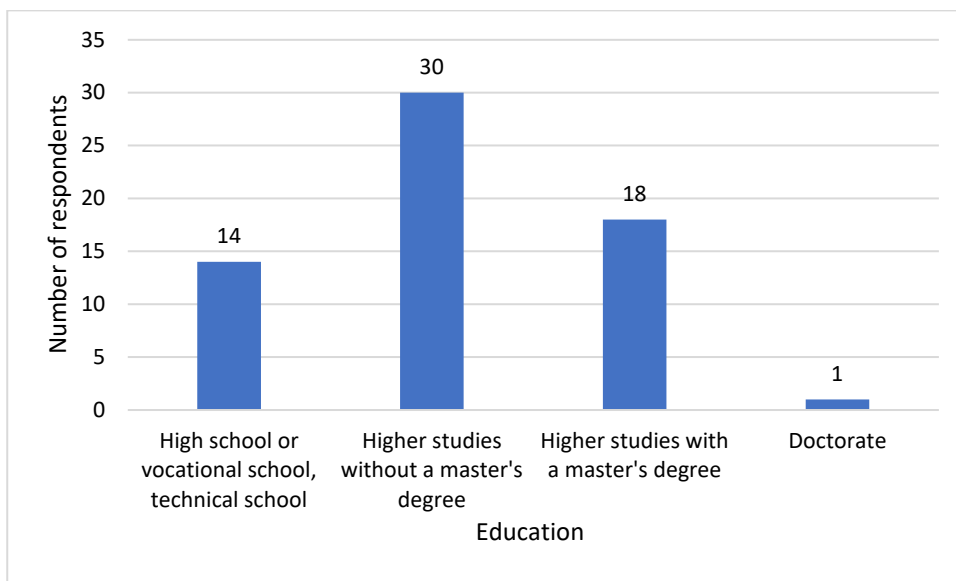


Figure 3. The level of education

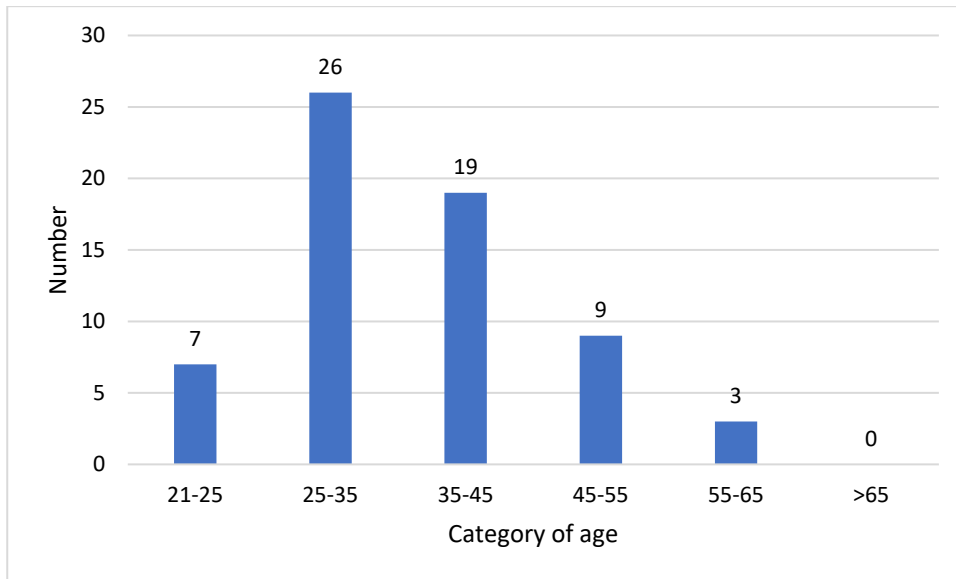


Figure 4. Age of the sample on which the questionnaire was applied

Results and discussion

The group on which the initial analysis was carried out consists of 25 people who currently have a business, 28 do not have any business, 6 have an NGO and 2 people do not answer or do not know, Figure 5.

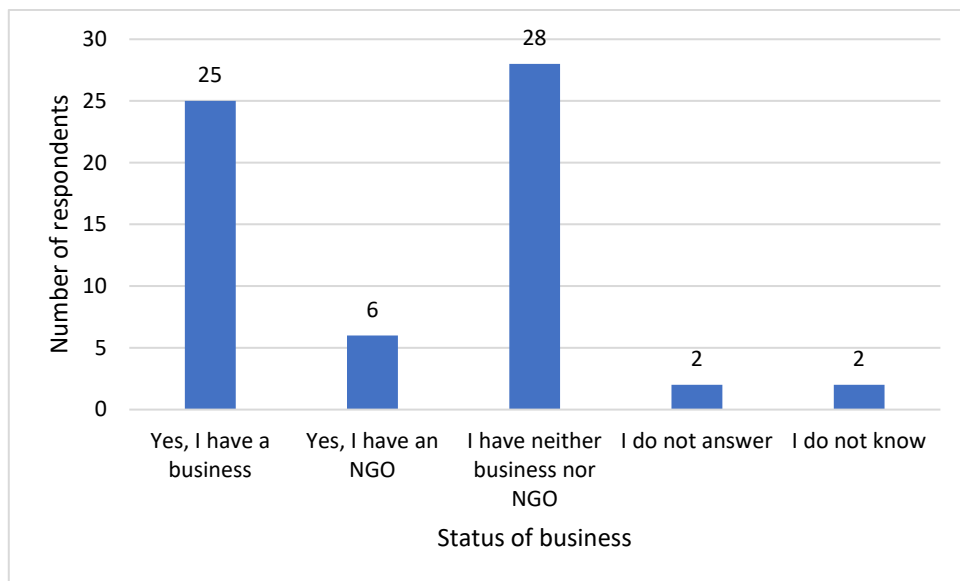


Figure 5. The status of business in present

The entrepreneurial experience highlighted that 63% of the participants in the study have entrepreneurial experience and 37% have none, Figure 6.

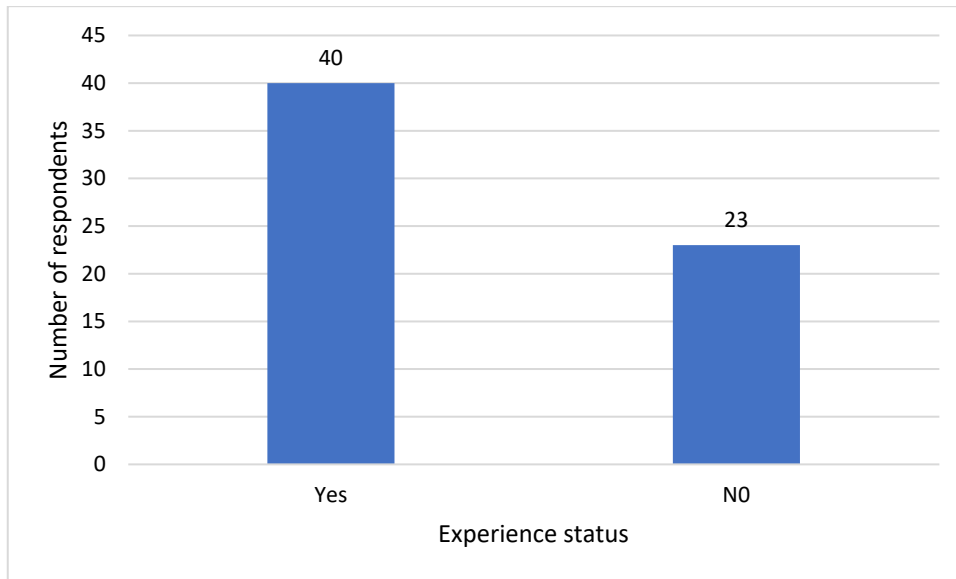


Figure 6. Entrepreneurial experience

Currently, 43 people have a concrete business idea, 19 have several ideas but have not decided and one person has no idea, Figure 7.

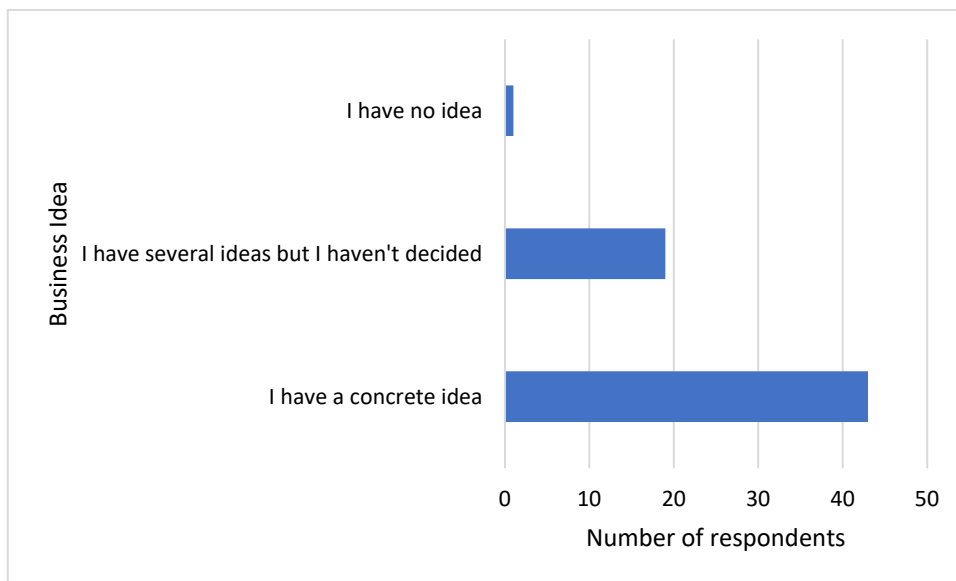


Figure 7. The entrepreneurial status of the respondents

In the study it resulted the amount they would need to start a business according to the study participants is 57% for > 150000 euro and 30% for 10000 euro – 30000 euro, Figure 8. The need for financing a small business is not very high and solutions can be found through European and national programs.

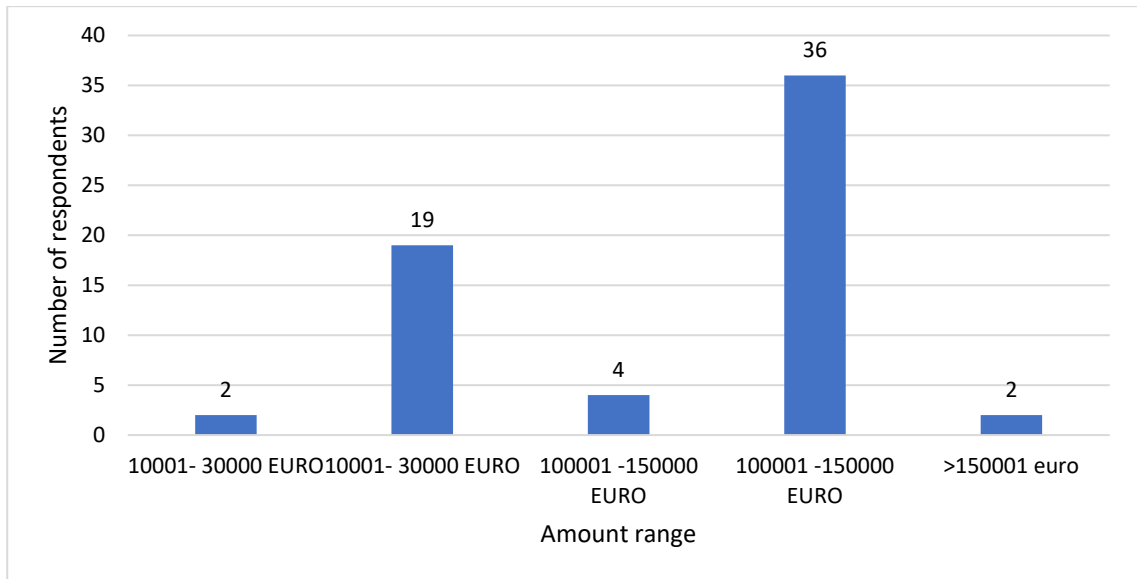


Figure 8. Amount range they would need to start a business

Regarding theoretical knowledge, 73% did not participate in an entrepreneurial training program, respectively 27% were involved in a learning process, Figure 9.

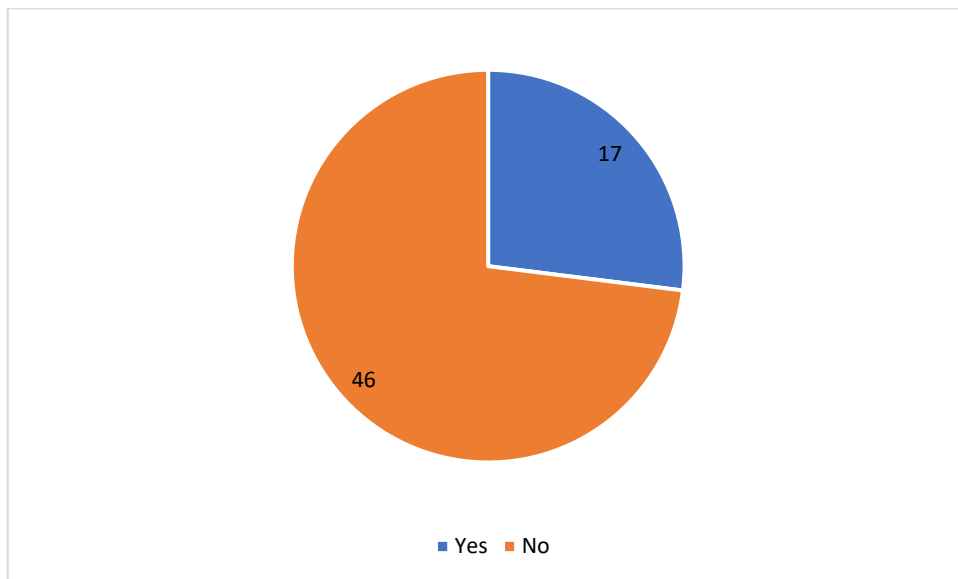


Figure 9. Have you participated in entrepreneurial training courses so far?

From this group of the respondents 68% have experience in developing a business plan, respectively 32% have never developed a business plan, Figure 10.

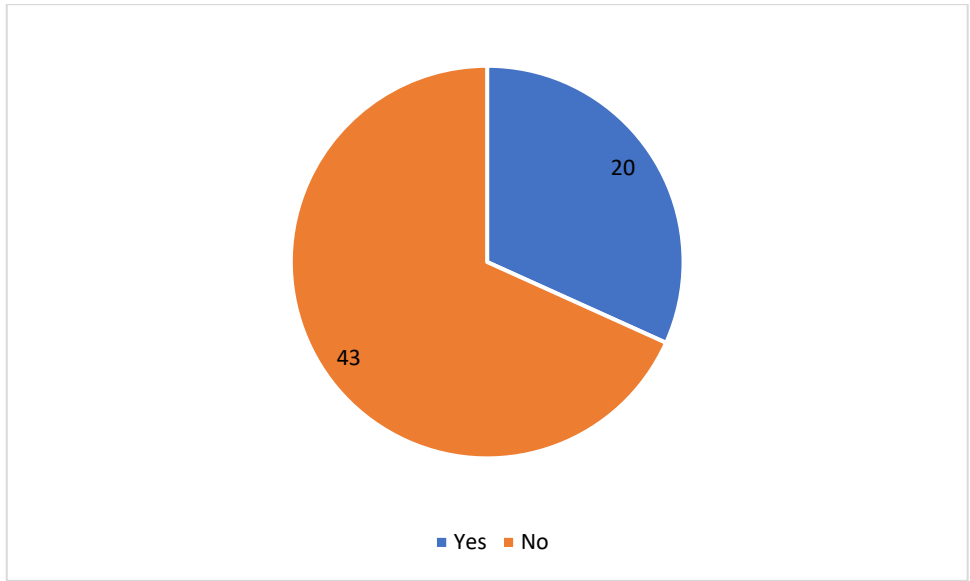


Figure 10. Have you ever developed a business plan?

The entrepreneurial courses followed by the respondents contribute to the development of entrepreneurial skills. When asked about the extent to which these courses helped the respondents, it can be observed that 31 of the respondents say that they helped them a lot, 25 it helped them a lot and 7 it helped them a little, Figure 11.

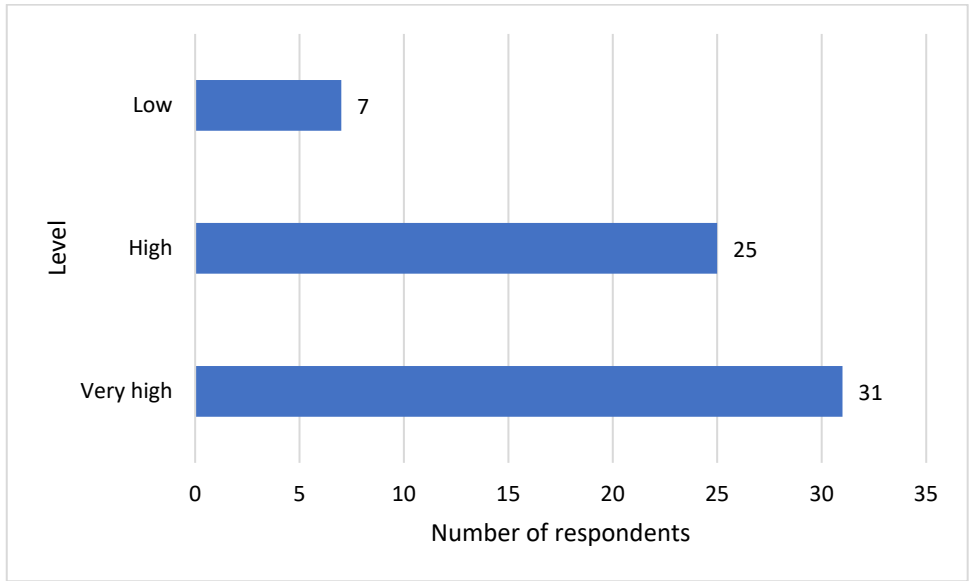


Figure 11. The entrepreneurial courses contribute to the development of respondents' competencies

The interest for a certain economic field showed the majority orientation towards production activities (17 people), agriculture (14 people), cultural activities (8 people), tourism and IT (5 people), Figure 12.

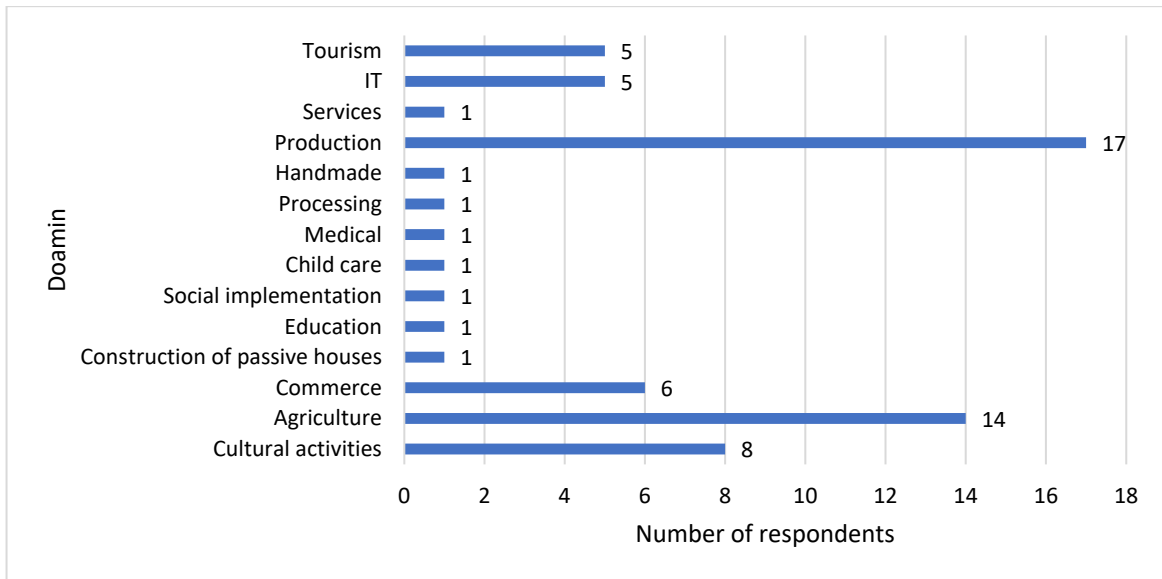


Figure 12. Economic area of interest resulting from the questionnaire

The barriers encountered by the respondents in the way of developing a business are presented in Figure 13. It can be observed that most respondents did not have financial resources (28 respondents) and 14 of them currently have another business in which they are not majority shareholders.

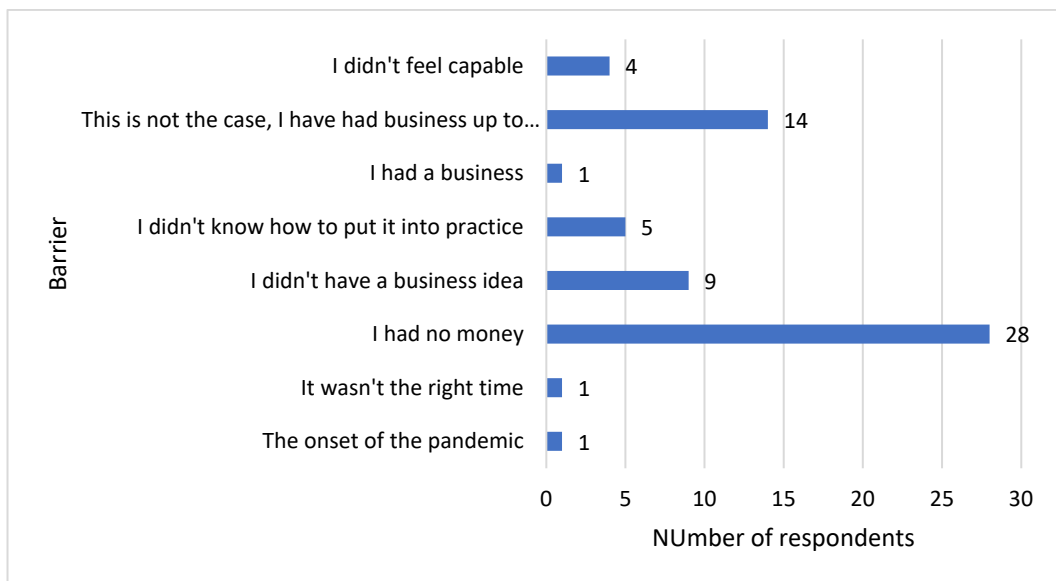


Figure 13. The barriers in the development of a personal business

The needs of entrepreneurs in developing their own businesses are meetings with other entrepreneurs to exchange ideas, smart contracts, workshops for the development of business communication skills, networking, strategic management, personal branding, mentoring/counseling, personal branding, and participation in trade fairs or events in the industry where you will develop your business. The distribution of answers to these needs is presented in Figure 14. It can be seen that the meetings with other entrepreneurs are the most appreciated by the respondents (37 respondents).

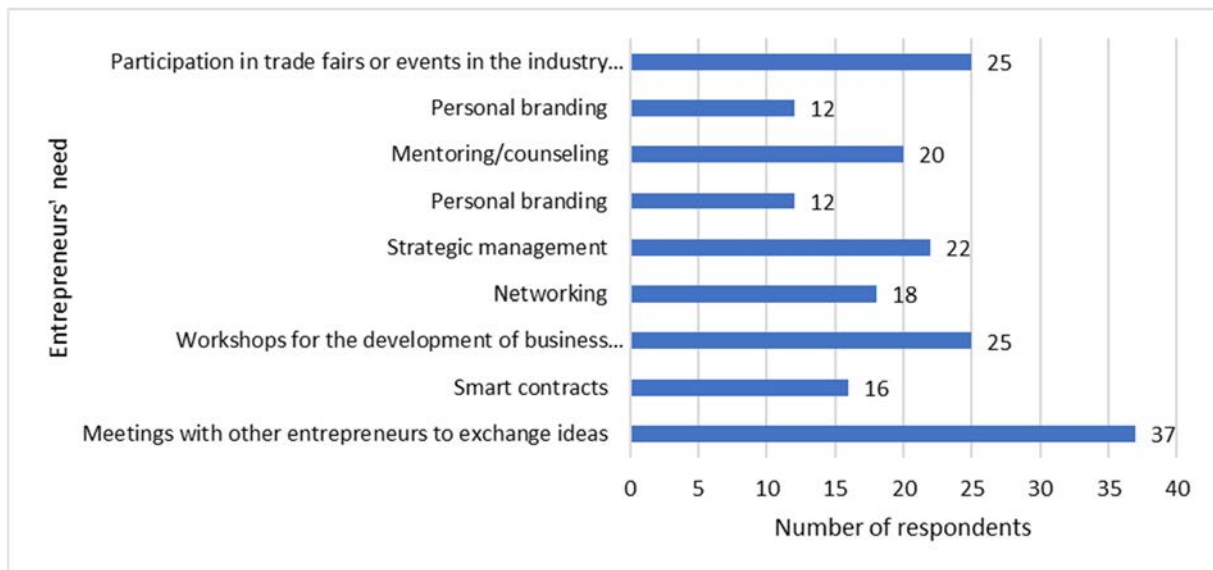


Figure 14. The needs of entrepreneurs in the development of their own businesses

Discussion

The general objective of the SusRural project is to strengthen economic and social cohesion in the West region to combat poverty and socio-economic integration of people belonging to vulnerable groups. Social entrepreneurship is a challenge for entrepreneurs because it is not aimed at registering profit through the work they carry out.

These learning methods can constitute an analysis of a distinct work and that manages to capture the characteristics and particularities of rural entrepreneurship and in the development of a successful learning model. Making incubators and simulation games for entrepreneurship activities can help through concrete examples for participants to discover what mistakes can be made and how they learn from them (Ciolac et. al, 2022).

The factors contributing to the adoption of urban agriculture have positive and negative results. These connotations affect mental and physical perception.

The entrepreneurial process involves creativity, risk-taking and innovation (Hu, R., Wang, 2018). This study highlights the factors that need to be addressed to increase food safety, and health at work.

These methods of education can constitute an analysis of a distinct work that succeeds and captures the characteristics and particularities of entrepreneurship and the development of entrepreneurship a successful model.

A studied model presents the basic levels that must be considered for the development of a theoretical framework. This model includes characteristics of the entrepreneur (temperament, attitude, knowledge) and capacities for rural development (Zamani, N., and Mohammadi, M., 2018; Hou et al., 2018). The studied model (D'Ostuni, F., and D'Ostuni, M., 2021) presents the main elements of a development model: the characteristics of the entrepreneur, the location of the business, external features, internal features, and innovation.

Based on the models studied and the market research undertaken, the important levels of an entrepreneurship model in the rural environment can be outlined: the characteristics of the entrepreneur (the most important being passion, motivation, communication, and financial resources), innovation, the entrepreneurial knowledge of the individual and the attitude towards of the social dimension. Model of entrepreneurship in rural areas in our vision is presented in Figure 15.

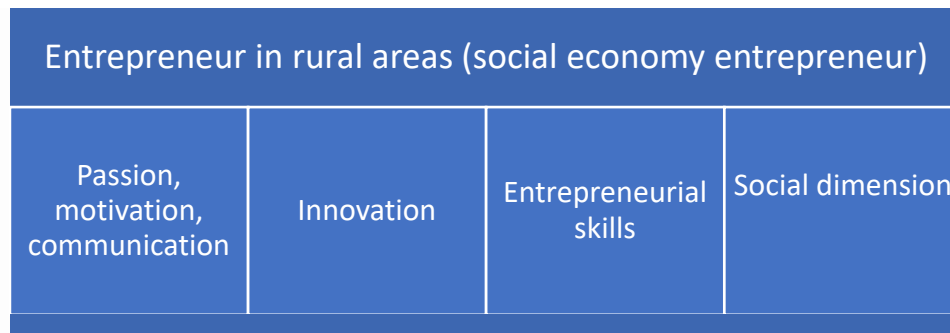


Figure 15. Model of entrepreneurship in rural areas

Conclusions

Supporting the development of businesses in the rural environment contributes to the economic growth of the respective environment, to the improvement of the standard of living and to the integration of the community in the dynamic business environment. The obtained results emphasize that the respondents are interested in the development of some social enterprises in the rural environment. At the same time, it was observed that many of the respondents had previous entrepreneurial experiences or had tangential ones.

The development of entrepreneurship in rural areas is an activity with a major impact in the economy of the future and with many challenges. Identify key learning and counselling models to form a significant critical mass of successful entrepreneurs contributing to sustainable rural economic development.

The limitations of this research refer to the domicile of the respondents. The domicile of the respondents should be in the Western Region of Romania. As future research, we will aim to expand the research at the national and international level.

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ANALYSIS OF THE DYADIC RELATIONSHIP BETWEEN LEADER AND SUPPORTERS IN TEAM WORK AT AN AUTOMOTIVE COMPANY

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Abstract

Purpose – The paper aims to study and analyze the existing relationships between leaders and supporters within an automotive company from Sibiu, in order to emphasize the importance that can be developed between the two components of the dyad, from the perspective of the work climate and the performance.

Methodology/approach – The study is based on two questionnaires distributed to both team leaders and employees (team members) within the company, with most similar questions, precisely to see the opinions of the two components of the dyad. The research is a quantitative type, trying to capture the typology of existing relationships in a company with a productive profile.

Findings – At the level of the studied company, communication is efficient and satisfactory, from the perspective of correlating the level of expectations with that of the perceived reality, both for employees and for leaders. Communication is carried out in a relaxed, friendly manner, characterized by availability for collaboration, consultation, offering useful information and support.

Research limitations/implications – The paper focuses only on one company, with a clear field of activity. In order to extend the conclusions to a wider level, it is necessary to extend the study to a larger number of companies and even to a variation of their field of activity.

Practical implications – Communicating the results of the analysis to the company's management clarified, to a large extent, the image related to the work climate within the organization and highlighted the means to regulate relationships, so that they evolve towards higher standards.

Originality/value – The contribution brought by this study, carried out at the request of those in the company, is related to the identification of a real situation and the identification in an objective way of the typology of the dyadic relationship between leaders and supporters within a company focused on the production side, where, usually, relationships are more tense and the pressure of short deadlines in honoring orders can leave its mark on the quality of these relationships.

Key words: leadership, relationship, supporters.

Introduction

We are living in a stage where the paradigm in which the business environment is designed is increasingly complex, a stage being characterized by much turbulence and uncertainties, which leave a substantial mark on the elements of performance and sustainability. One certainty in this complex situation is the way in which leadership leaves its mark on relationships within organizations, the way in which an organizational culture based on trust is generated, which determines organizational sustainability even in difficult times. From this point of view, leadership is that binder that can offer relevant solutions by creating a connection between the management area and the work teams, transferring trust and a clear vision regarding the organizational evolution and opening communication channels and levers of influence to come from work teams, supporters, employees. Moreover, in an organization focused on production, within an industry that has major challenges regarding business market developments, leadership can be the one that offers stable and pertinent solutions regarding the construction of a people-centered culture that leads to performance.

In recent years, awareness of this issue has increased worldwide. The importance of studying and understanding the phenomenon called "leadership" is recognized. Discovering the "secret" that is the basis of effective leadership would contribute substantially to the development of organizations' ability to classify and help to evolve managers and leaders. In order to better understand the current trends regarding the concept of leadership, (Zohar, I., 2016)

Many leadership researchers have focused more on leaders and paid less attention to supporters (employees). Lately, more and more researchers have put, and emphasize, the dyadic approach, a concept that is based on the relationships (relationship systems) between the leader and the supporter in some work subunit. The dyadic approach to leadership tries to explain why leader behavior varies from one follower to another. The dyadic approach also shows the different behaviors of the supporters towards the leader. For example, if the supporters' opinion about the leader is tested, it is possible to see two categories of dyadic relations: one group characterizes the relations with the leader as positive and another group as negative (Țuțurea, Miricescu, Moraru, Grecu, 2010).

The research on dyadic leadership differs from other theories of leadership that address generalized leader behaviors and traits to all followers. For instance, dyadic relationships, assumes that leaders differentiate among subordinates in the establishment of these relationships, and describes a role-making process that leads to the development of the relationships. The dyadic approach is also concerned with the outcomes of these relationships for individuals and the organization. (Brower, H. H., Schoorman, F. D., and Tan, H. H., 2000)

General elements regarding the realization of the study

The research whose analysis is presented was carried out on the basis of a questionnaire within a company whose main activity is the production of auto components in the industrial area of the municipality of Sibiu. The main objective of the research is to highlight the existing relationships between employees (supporters) and leaders within work teams, trying to highlight the fact that the existing dyadic relationship between the two components can be influenced by each component of the dyad. Precisely for this reason, two types of questionnaires were administered, with many similar questions, one with the target group of team members within the company (the so-called supporters, from the point of view of leadership theory), and the other targeting the team leaders within the company. For this reason, there is also an imbalance between the numbers of respondents from the two types of questionnaires, the team leaders being a much smaller group than the company's employees. According with these specifications, the application of the questionnaire had in mind a representative sample, the target population being the employees and leaders of the automotive company. The first questionnaire targets the company's employees, and the research was carried out on a sample of 147 employees from different departments. The second questionnaire targets leaders within the company, and the research was carried out on a sample of 21 leaders of different departments. The departments included in the research were: the production department, the quality department, the purchasing department, the accounting department, the human resources department.

In accordance with the main objective of the research, several secondary objectives were developed, each with several working hypotheses to be verified as part of the analysis of the questionnaire results. Thus, the following secondary objectives and the following working hypotheses were established:

Objective 1: Measuring the level of relationship between leaders and supporters within the automotive company

Hypothesis 1: Seniority in the workplace may lead to more effective networking due to more in-depth knowledge of internal procedures, manufacturing processes, and personnel.

Hypothesis 2: In a company where the employee has the freedom to plan, schedule, organize and control his own work, it can lead to more effective communication with leaders because the employee is trusted to make decisions.

Hypothesis 3: The involvement of employees in decision-making and the improvement of processes within the company can ensure a more effective relationship between leaders and supporters by reaching the need to confirm their skills.

Objective 2: Measuring the degree of satisfaction, involvement and motivation of the staff in the actions aimed at increasing the performance of relations with their leaders.

Hypothesis 1: Employee satisfaction is found in the level of involvement and motivation through effective actions of the company.

Hypothesis 2: The level of motivation of employees is found in the quality of relationships.

Objective 3: Identifying the degree of satisfaction of the relationship within the company both from the point of view of the employees and the leaders.

Hypothesis: Within a successful company, the level of satisfaction of relations between leaders and supporters must be perceived equally by both parties involved, avoiding situations where the relationship is considered optimal only from the perspective of employees or leaders.

The process of analysis and interpretation of the data obtained following the application of the questionnaires will be done taking into account the research objectives and hypotheses.

The level of relationship between leaders and supporters within the automotive company

Hypothesis 1: Seniority in the workplace may lead to more effective networking due to more in-depth knowledge of internal procedures, manufacturing processes, and personnel.

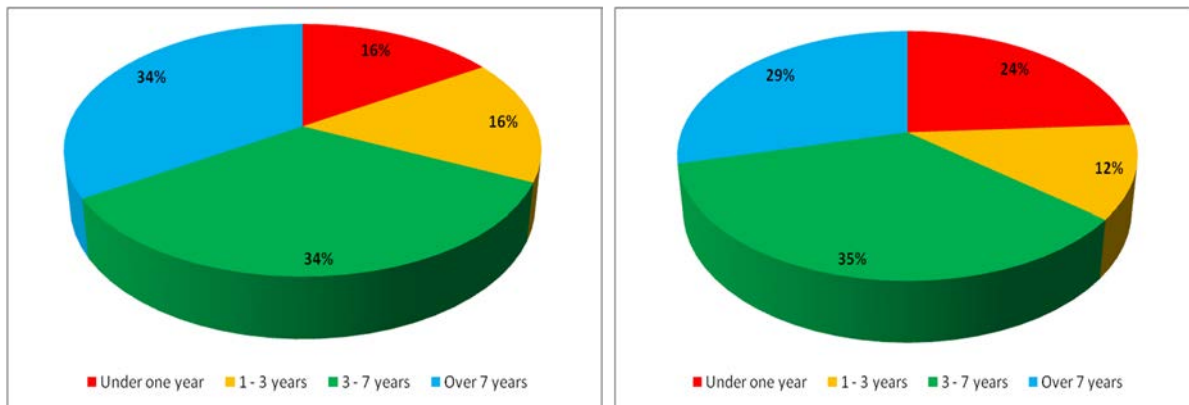


Fig. 1: How long have you worked for this company? (Supporters – left, Leaders – right)

Analyzing the answers received following the question, "How long have you worked in this company?", from the company's employees it can be observed a majority percentage for a seniority between 3 to 7 years (34.4%), respectively over 7 years (34.4%). Regarding the response of the leaders, it can be observed that the majority response falls within the same seniority within the company, 3 to 7 years (35.3%), respectively over 7 years (29.4%). Considering the previously mentioned hypothesis, through the seniority of the employees and leaders, it can be deduced that within the company analyzed, the activity is carried out with employees and leaders who appreciate the values and professional relations within the company. Seniority on the job leads to more effective networking due to more in-depth knowledge of internal procedures, manufacturing processes and personnel.

Hypothesis 2: In a company where the employee has the freedom to plan, schedule, organize and control his own work, it can lead to more effective communication with leaders because the employee is trusted to make decisions.

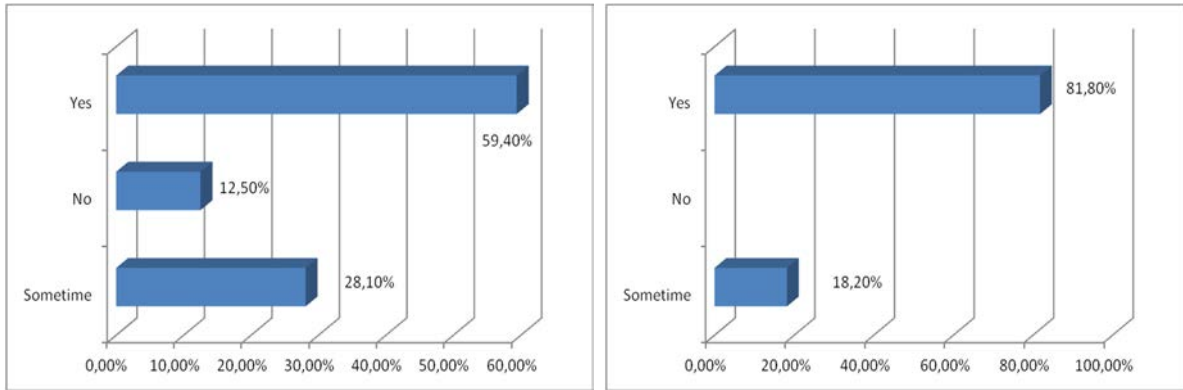


Fig. 2: Do you have the freedom to plan, schedule, organize and control your own work? (Supporters – left); Do you give employees freedom to plan, schedule, organize and control their own work? (Leaders – right)

59.4% of company employees appreciate that they have the freedom to plan, schedule, organize and control their own work, and 28.1% answered that they are sometimes allowed to do this. 81.8% of company leaders appreciate that they encourage employees to plan, schedule, organize and control their own work.

From the answers given, we can highlight that within the company employees are encouraged to take responsibility for the activities they carry out. Through the freedom to organize and plan their own way of working, trust is given to employees, this being a very good supporter of the relationship between them and the leaders. By encouraging employees to control their own work, leaders can achieve higher performance by empowering employees. Employees know their tasks much better, so communication between them can be free of employees' fear of failing or giving wrong information.

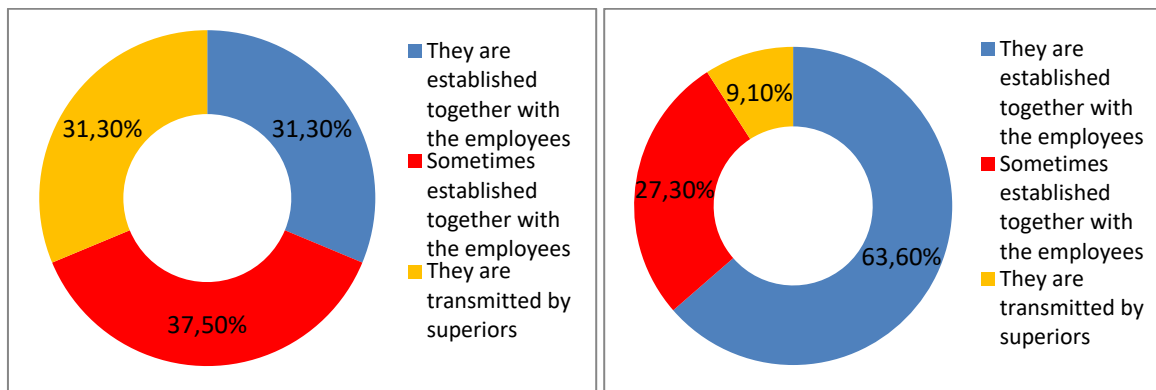


Fig. 3: Are the objectives to be met established with your participation or are they simply passed on to you by the leader? (Supporters – left); Are the objectives to be met set with employee participation or are they simply passed on? (Leaders – right)

In terms of setting the objectives to be met, both employees (37.5% set with employees and 31.3% sometimes set with employees) and leaders (63.6% set with employees and 27.3% sometimes are established with employees) of the company believes that to a high extent they are established together with the team. A small discrepancy can be observed between the considerations of employees and leaders, the latter giving a much higher percentage to the transmission of objectives.

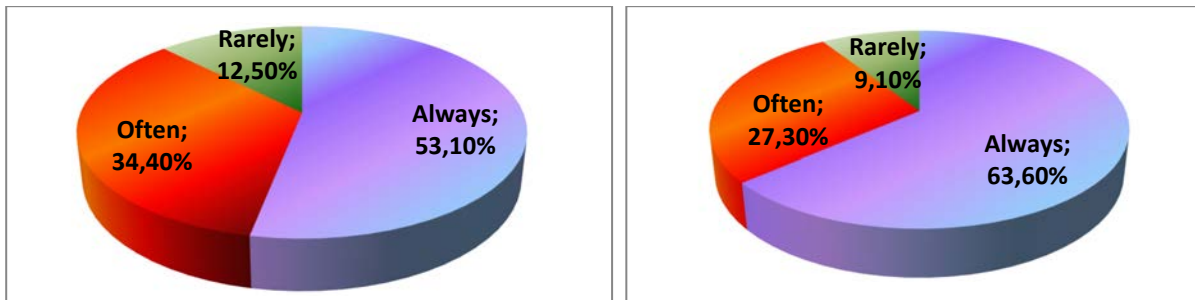


Fig. 4: Do you know the results expected by the leader from you? (Supporters – left); Are the results expected by you transmitted to the employees? (Leaders – right)

In order for the employees to get to know the way of working and the capabilities of the others, the leaders must establish the team's objectives together with them and convey the expected results. As a result, employees will be less hesitant to express their opinions and ideas, and they will begin to think about achieving goals as a team and not as an individual. This stage can be recognized by the leader through the help, assistance and support that employees offer to others in carrying out work tasks. At this stage, positive feedback is important so that the team knows that its progress and achievements are recognized.

Within the company analyzed, 53.1% of employees believe that they always know the leaders' expectations regarding the tasks they have to perform, 34.4% quite often and 12.5% rarely. Company leaders appreciate in a percentage of 63.6% that they always convey their expectations, 27.3% quite often, and 9.1% rarely.

Hypothesis 3: The involvement of employees in decision-making and the improvement of processes within the company can ensure a more effective relationship between leaders and supporters by reaching the need to confirm their skills.

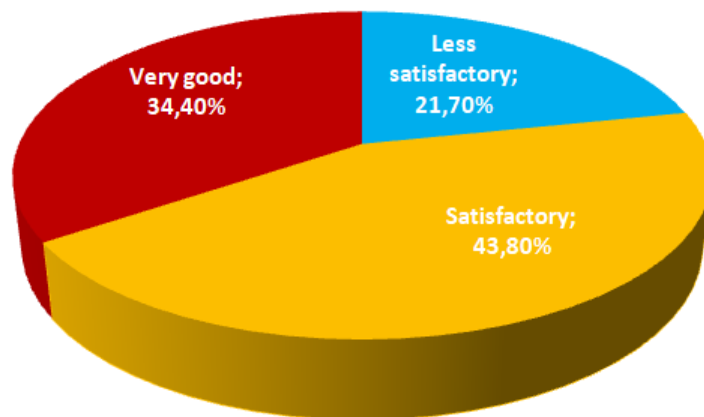


Fig. 5: How do you feel about your professional development within the company? (Supporters)

The company's employees consider their professional development within the company to be satisfactory and very advantageous, preferring to work in a team. Thus, most employees do not view their work as an individual effort, but rather as a group achievement. Thus they can assume a commitment to the team, leader or company, this increasing productivity and work dynamics. It is no longer necessary to involve the leader so strongly as an authority figure. You can increase the interaction with the staff, encourage them and maintain a proactive attitude, developing an environment of trust.

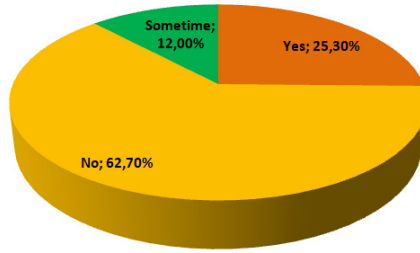


Fig. 6: Do you prefer to work independently rather individually? (Supporters)

The degree of satisfaction, involvement and motivation of the staff in the actions aimed at increasing the performance of relations with their leaders.

Hypothesis 1: Employee satisfaction is found in the level of involvement and motivation through effective actions of the company.

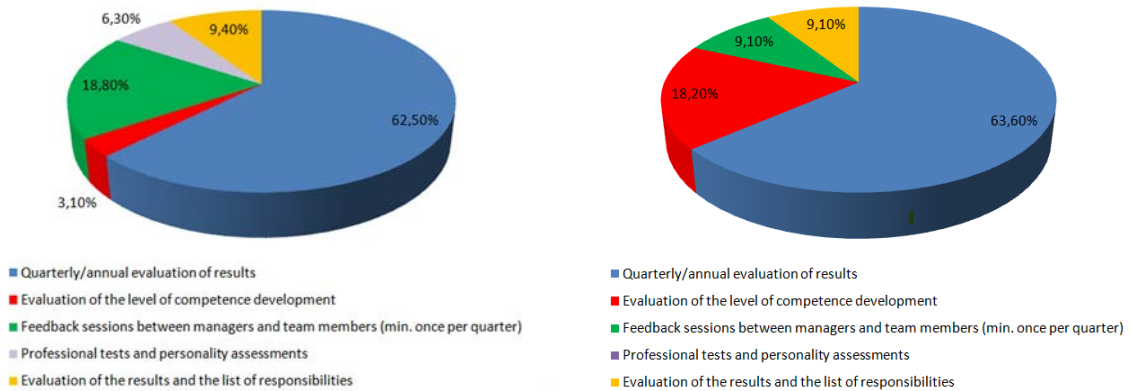


Fig. 7: Specify the performance evaluation methods and tools used within the company (Supporters – left, Leaders – right)

The most frequently used performance evaluation methods and tools within the company are: quarterly / annual evaluation of objectives, evaluation of the level of skill development, feedback sessions between manager and subordinate (min. once per quarter), and evaluation of results/list of responsibilities.

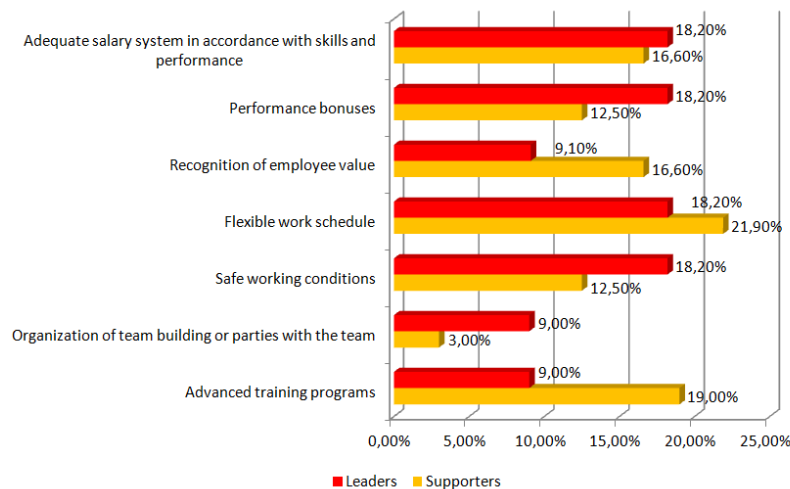


Fig. 8: Which of these are the most interesting and most used ways to motivate the team?

The ways in which employees are motivated are: adequate salaries, performance bonuses, recognition of the value of the employee, flexible schedule, safe working conditions, organization of team building/parties with the team, improvement programs.

The main purpose of motivating employees is their proven role in improving workplace performance. For this, company leaders need to know their employees and the climate within the teams, in order to apply the best strategies to retain talent in organizations and attract new competent candidates.

Hypothesis 2: The level of motivation of employees is found in the quality of relationships.

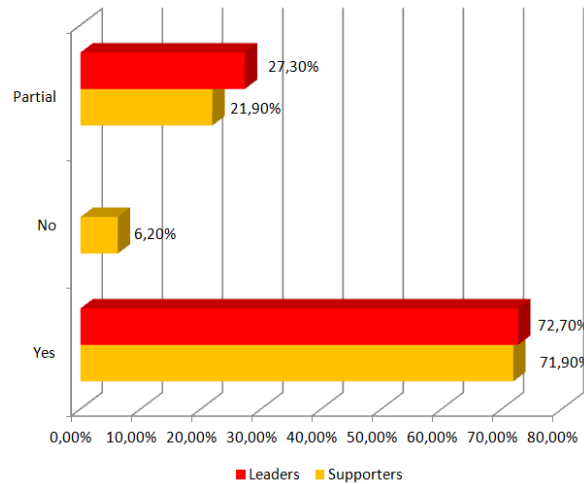


Fig. 9: If you achieve performance, do you enjoy recognition from your leader? (Supporters); If employees are performing, do you capitalize on the results? (Leaders)

In proportion of 71.9% (supporters) and 72.7% (leaders) the employees' performances are recognized by the leaders. The objective evaluation and appreciation of individual performance is the basis of on-the-job training and improvement of work motivation. Labor relations generate and maintain the climate favorable to the achievement of individual and team performances.

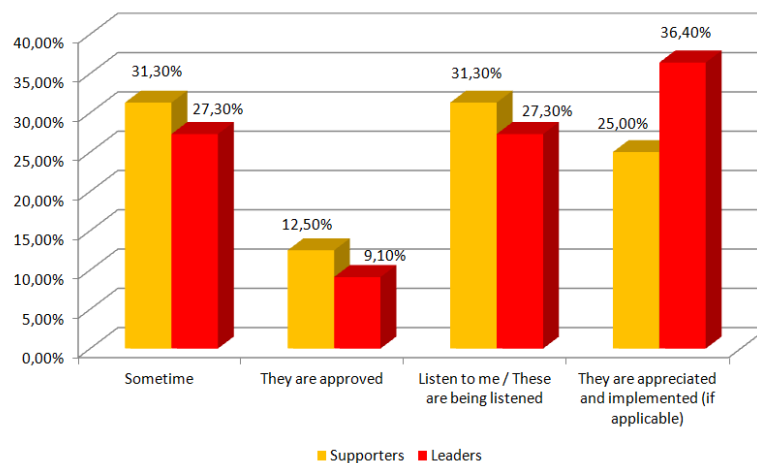


Fig. 10: Do you think that your leader listens to you and analyzes your ideas/proposals for improvement? (Supporters) – Do you pay attention, listen and analyze employees' ideas/suggestions for improvement? (Leaders)

More and more organizations discover the power of teams in carrying out tasks related to creativity, which contribute to innovative solutions for solving problems in an organization. In order for teams to play a greater role in the creativity process, an organization must create the necessary conditions for the manifestation of team creativity. It seems that within this company, employees' ideas and proposals

for improvement are listened to, approved, appreciated and implemented (if applicable). Employees are encouraged to find ways to improve processes and procedures.

Identifying the degree of satisfaction of the relationship within the company, both from the point of view of the employees and the leaders

Hypothesis: Within a successful company, the level of satisfaction of relations between leaders and supporters must be perceived equally by both parties involved, avoiding situations where the relationship is considered optimal only from the perspective of employees or leaders.

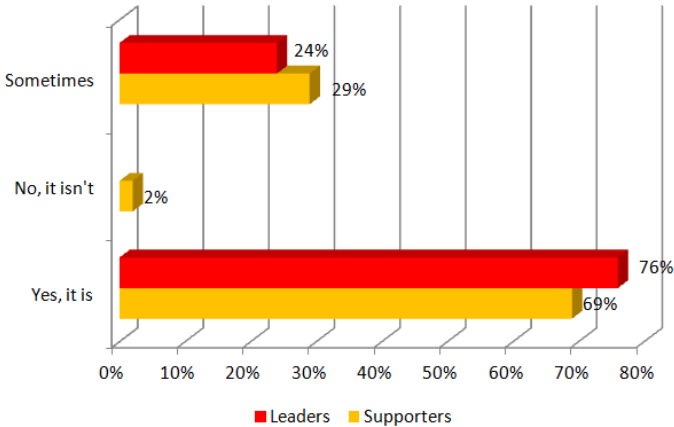


Fig. 11: Do you think that there is an effective communication and collaboration relationship between the leader and the team members?

Both the employees and the leaders, within this company, believe that there is an effective communication relationship between them. Internal communication is one of the means by which the smooth running of the organization is ensured, and a good business strategy also includes a constant dialogue with employees. They need to know what is happening in the company, what are the directions of activity and in what way their jobs will be influenced by the management's decisions. Developing good employee communication requires long-term work and a well-designed strategy, not just spur-of-the-moment initiatives. Thus, communication must be constant and consistent, be represented by the transmission of relevant messages, of interest and with impact on its receivers.

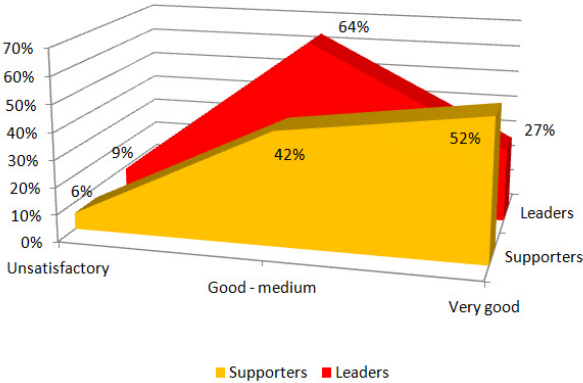


Fig. 12: Rate your overall satisfaction with the relationship between leaders and employees

From the diagrams above, it can be seen that both employees and leaders consider the employee-leader relationship to be satisfactory. Living and working together, we must know each other's interests. Mutual knowledge is the basis of our existence. Any professional group has a leader, any institution, regardless of its profile and mission, has a certain structure, created to ensure the functions or activities necessary to achieve the proposed goal. The entire activity of an organization is carried out by people, framed according to certain principles, specific work groups, who play certain professional roles, have

a certain status and a certain status. That's why the relationship between leaders and employees is very important, it makes the company run smoothly.

Discussion and conclusions

The dyadic relationship and communication between leader and employees is a key point in organizations. Ideally, this exchange should give the leader the opportunity to direct his employees to the proper completion of tasks, clarify the context of the reward, and provide social and emotional support.

The research of the central objectives (the level of relationship between leaders and supporters, the degree of satisfaction, involvement and motivation of the staff, the degree of satisfaction of the boss-employee relationship) and the hypotheses (the freedom to plan, program, organize and control one's own work, the involvement of employees in decision-making and process improvement, employee satisfaction, employee motivation level) provide the following set of conclusions:

- The trends are to transform existing businesses into agile businesses, able to deal with rapid changes, and workers to be guided to deal with any situation
- The degree of involvement, respectively, motivation of a company's staff can be found in the attitude and interest they have in relation to the company
- Organizational climate is determined by labor relations
- Work organization increases the quality of professional life
- The degree of employee motivation influences the company's results

Following the application of the questionnaire, we can appreciate that, at the level of the studied company, communication is efficient and satisfactory, from the perspective of correlating the level of expectations with that of the perceived reality, both for employees and for leaders. Communication is carried out in a relaxed, friendly manner, characterized by availability for collaboration, consultation, offering useful information and support in overcoming any professional difficulties.

The seniority of the employees and leaders, denotes the fact that within this company, the activity is carried out with employees and leaders who appreciate the values and professional relations within the company. Seniority on the job leads to more effective networking due to more in-depth knowledge of internal procedures, manufacturing processes and personnel.

Regarding the employees' freedom to plan, schedule, organize and control their own work, we can highlight that the company encourages employees to take responsibility for the activities they carry out. Through the freedom to organize and plan their own way of working, trust is given to employees, this being a very good supporter of the relationship between them and the leaders. By encouraging employees to control their own work, leaders can achieve higher performance by empowering employees. Employees know their tasks much better, so communication between them can be free of employees' fear of failing or giving wrong information.

Also, the results expected by the leaders are transmitted to the employees. In order for the employees to get to know the way of working and the capabilities of the others, the leaders must establish the team's objectives together with them and convey the expected results. As a result, employees will be less hesitant to express their opinions and ideas, and they will begin to think about achieving goals as a team and not as an individual.

The company's employees consider that their professional development within the company is satisfactory and very advantageous, preferring to work in a team. Thus, most employees do not view their work as an individual effort, but rather as a group achievement.

The main purpose of employee motivation within the company is its proven role in improving workplace performance. For this, company leaders need to know their employees and the climate within the teams, in order to apply the best strategies to retain talent in organizations and attract new competent candidates. Within this automotive company, employees' ideas and proposals for improvement are listened to, approved, appreciated and implemented (if applicable). Employees are encouraged to find ways to improve processes and procedures.

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THE INFLUENCE OF PUBLIC PROCUREMENT ON EU PROJECTS AIMED AT COMBATING THE COVID-19 CRISIS

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Abstract

Purpose – This paper aims to investigate how EU grants awarded to increase the capacity to manage the covid-19 health crisis are influenced by the duration of public procurement processes.

Methodology/approach – Empirical study of the public procurement processes carried out within the projects financed by the Large Infrastructure Operational Program - Axis 9 (LIOP 9.1)

Findings – A critical picture of the impact of the duration of the procurement processes carried out within the projects financed from the LIOP 9.1 program on the objectives pursued by this program.

Research limitations/implications – This study does not analyze the ongoing projects nor the particular arguments, motivations or decisions adopted within the public procurement procedures organized by each beneficiary of the Axis 9 POIM program

Practical implications – The results of the study provide information on the specific factors of public procurement processes that can influence the achievement of the objectives of a financing program aimed at eliminating the effects of the COVID 19 crisis.

Originality/value – His paper provides a documented picture of how public procurement processes impacts the objectives of a targeted financing program dedicated to eliminating the effects of a crisis.

Key words: Public procurement, EU Funding, Covid-19 crisis.

Introduction

The problems of public procurement in Romania is well known both from the information circulated in the public space and from the periodic reports carried out by National Agency for Public Procurement (NAPP), the most frequent criticisms being those regarding the very long durations of public procurement processes.

The frequent amendments to the specific legislation only imposed (as an obligation) the reduction of the deadlines for the execution of a public procurement procedure, without analyzing which of the stages of the public procurement process produces the greatest delays.

With the onset of the COVID 19 crisis, public authorities in the EU were put in a position to procure products and services necessary to combat the effects generated by the pandemic, on which occasion they had to carry out public procurement in a crisis context.

As established by Decree no. 195 of 16.03.2020 (The President of Romania, 2020), during the period of action of the state of emergency (15.13.2020-15.05.2020) the contracted authorities had the opportunity to carry out emergency procurement processes, which involved fewer formalities and reduced times.

With the end of the state of emergency (15.05.2020), they had to return to the application of usual public procurement processes, even for the purchase of products aimed to combat the effects of the COVID 19 pandemic, effects that provided health authorities with challenges until the first quarter of 2022.

After Romania's exit from the state of emergency caused by the COVID-19 pandemic, the Ministry of European Funds (MEF) initiated the call for projects. "Strengthening the capacity of the public medical

system to manage the emergency situation caused by the Covid-19 crisis" within Priority Axis 9 Protecting the health of the population in the context of the pandemic caused by COVID-19, Specific Objective 9.1 Increasing the capacity to manage the health crisis COVID- 19. from the Large Infrastructure Operational Program (LIOP 9.1).

LIOP 9.1 projects are mainly aimed at equipping the beneficiaries with medical equipment and devices as well as other specialized products, necessary for the activities to combat the effects of COVID 19.

Therefore, the activities proposed by the LIOP 9.1 projects followed the purchase of products and equipment intended to achieve the following result: „Timely and efficient response of the public medical system to the COVID-19 crisis" (Ministry of European Funds, 2020, pp. 5, 29).

Application guide for LIOP 9.1 approved by MEF Order no. 613/15.05.2020 (Ministry of European Funds, 2020) established an initial calendar for the submission of projects 15.05.30.09.2020, with a deadline for completing the projects 31.12.2020, the budget allocated to these projects being approx. 350 million Euros, 100 percent non-refundable funds secured from the state budget and the budget of the EU.

LIOP 9.1 projects were implemented according to the framework specific to projects financed by EU funds and the object and activities proposed by these projects were similar. In the same way, the ongoing procurements within these projects were mostly similar in terms of the object and type of procurements. These elements provided a unitary and comparable framework, favorable for the conduct of our research

Through this measure, a number of 159 projects were contracted, amounting to a contracted value of funding of approx. 168 million euros.

Because of the slow development of these projects, the MEF adopted repeated decisions to extend the project implementation period until 30.04.2021¹, until 18.06.2021², until 31.08.2021³ respectively until date of 31.12.2023⁴.

Analyzing this preliminary picture, we naturally raised the following question: "Are the public procurement processes carried out at the level of the beneficiaries of this financing adapted to a quick response to eliminate crisis situations?"

Theoretical model and methodology

Theoretical model

The public procurement process consumes both material and time resources, directly affecting the activities proposed within the projects with non-reimbursable EU funding.

Analyses and reports carried out at the national level have repeatedly contrasted the fact that often delays in the activities of contracting authorities are mainly due to cumbersome public procurement processes.

The latest NAPP report for the year 2020 on "Indicators for monitoring the efficiency of public procurement procedures" (Național Agency for Public Procurement, 2020) indicates that the average time of public procurement procedures carried out in Romania, related to supply contracts, is 70 days, of which the average time for evaluation of offers is 50 days.

Analyzing from the perspective of the implementation duration of LIOP 9.1 projects, repeatedly extended, the following natural question emerged: How does the durations of public carried out within a LIOP 9.1 project influence the implementation duration of these projects?

In order to identify a substantiated answer to this question, an in-depth study of the elements and how they impact the public procurement process on the calendar of the projects within which they take place was necessary.

¹ thru MEF Order no. 807/07.07.2020

² thru MEF Order no. 1364/18.11.2020

³ thru MEF Order no. 597/10.06.2021

⁴ thru MEF Order no. 904/30.08.2021

Within this research, the processes that take place within these projects were structured as follows:

- a) Activities assigned to the beneficiary regarding the public procurement processes within the project, which were structured in the following relevant stages:
 - i. Stage of the preparation of procedure
 - ii. Stage of bid submission
 - iii. Stage of the offer evaluation
- b) Activities assigned to the supplier, respectively the period of performance of the supply activities that are the subject of the public procurement contracts signed within the project.

Practically, the two sets of specific activities presented above determine the total project implementation period.

The activities presented above can be extended by a series of external events, which are not directly generated by the contracting authority and which can bring significant delays in the calendar of the public procurement process/projects, such as: (1) the introduction of an appeal by a bidder, (2) the selection of the procedure in the ex-ante control program run by the NAPP or even (2) the cancellation of the procedure.

Therefore it is relevant to understand how the occurrence of such events affects the calendar related to a public procurement process.

In this context, the final form of the research question takes the following shape: How do the stages of public procurement, respectively the external factors, influence the total duration of the implementation of the project in which the procurement takes place?

Methodology

To directly answer the research question, we selected the case study as the appropriate method for analyzing the results and how the stages/events influenced the implementation duration of a LIOP 9.1 project.

The collected data comes from the SEAP public procurement platform as well as from the documents and reports issued by the MEF (as the body responsible for the implementation of these financings) regarding the implementation of the LIOP 9.1 projects.

From these projects, for this research, only the projects that were in the completed stage on 31.05.2022, respectively 40 projects, were selected as units of analysis. This selection accumulates a total value of 98.7 million euros, representing 34% of the total number of financed projects, respectively 58.70% of the total value of the financed projects, a share considered significant and relevant for the research results.

From the report published on the website of the MEF (Annex 3 List of contracted projects 31.05.2022⁵), only the LIOP 9.1 projects were selected (according to the "Priority Axis/Investment priority" selector) which were in the „finished" stage (according to the "Project status").

For each of the 40 selected projects, data related to the public procurement procedures carried out within these projects were extracted from the SEAP platform, namely: (1) the unique number of the procedure, respectively the unique code of the related project, (2) the publication date of the procedure, (3) the deadline for submission of offers, (4) the date of deliberation (the date of completion of the evaluation of offers), (5) information regarding the appeals submitted, the progress of the ex-ante NAAP control or the cancellation of the procedure.

These data have been supplemented with the relevant information obtained from the MEF report (Ministry of European Funds, 2022) such as: (1) date of project initiation, (2) date of completion of project activities.

For the identification and extraction of data related to procurement procedures from SEAP and those related to LIOP 9.1 project, both the name of the beneficiary and the SMIS code (unique project identification code) were used as identification keys related to public procurement procedures/projects, keys that can be found in both the MEF report and the SEAP.

⁵ <https://mfe.gov.ro/wp-content/uploads/2022/06/b6a32eb035c5643fc9c3a9245e5f5d05.xlsx>

Research Design

Research variable

This study is aimed at identifying the way in which public procurement processes influence the calendar of LIOP 9.1 projects.

In this sense, it was analyzed:

- ✓ how events external to public procurement processes influenced the stages of public procurement processes, the total duration of public procurement process and the total duration of the projects
- ✓ the way in which the stages of public procurement influenced the total calendar of public procurement processes
- ✓ the way in which the total calendar of public procurement processes influenced the total calendar of projects

The variables used in this paper are based on the stages/elements selected and defined in accordance with the methodologies for the organization and application of public procurement procedures, imposed by law no. 98 from 2016 on public procurement

The specific details of each variable are described below.

Stages of the public procurement process (S)

The stages of the public procurement process consist of three relevant variables:

- ✓ Stage of procedure preparation (S1)
- ✓ Stage of bid submission (S2)
- ✓ Stage of bid evaluation (S3)

S1 - The stage of procedure preparation - refers to the period necessary to define the need and needs to be satisfied by the public procurement contract, drafting and approving the procurement documents describing these elements. In LIOP 9.1 projects, the preparation stage of the procedure begins with the initiation of the project and ends with the publication in SEAP of the procurement notice together with the procurement documents. The study of this stage is relevant from the point of view of evaluating the time required by the contracting authority to prepare the procurement documents and obtain their related approvals.

S2- The stage of bid submission refers to the period between the date of publication of the procurement notice in SEAP and the bid submission deadline. In LIOP 9.1 projects, this stage must be proportionally correlated with the type and object of the organized procedure. The study of this stage is relevant from the perspective of evaluating the time required for bidders to prepare and submit bids.

S3- The stage of bid evaluation refers to the period between the moment of submission of tenders and the moment of deliberation and selection of the winning tenderer (according to SEAP data) and exclusively involves the activity of the bid evaluation commission for the evaluation of all offers submitted in a tender. The study of this stage is relevant from the point of view of the evaluation of the time and professional resources necessary to be involved by the contracting authority for the in-time completion of the bid evaluation process.

External factors (F)

The relevant external factors that extend the calendar of public procurement and the projects in which they take place are represented by the following variables:

- ✓ Appeal (F1)
- ✓ Ex-ante Control (F2)
- ✓ Cancellation of the procedure (F3)

F1- The appeal refers to the action of a bidder to file an appeal at the National Council for Solving Complaints (NCSC) level or a complaint in court if the decisions taken by the purchaser harm its legitimate interests. This process is carried out according to law 101 from 2016, and leads to significant delays in the calendar related to the public procurement process, determined by the specific times of the appeal/complaint resolution process at the NCSC/court level. The study of this factor is relevant through the lens of evaluating how appeals influence the implementation calendar of LIOP 9.1 projects.

F2 - Ex-ante control refers to the function of exercising ex-ante control by the NAPP, according to Emergency Ordinance no. 98 of 2017. This control requires additional time (of an administrative nature) necessary for the consultation and/or approval by NAPP observers of all papers and decisions adopted during the procedure (The Government of Romania, 2017). The study of this factor is relevant from the perspective of evaluating the way in which this control influences the implementation calendar of LIOP 9.1 projects.

F3- Cancellation of the procedure refers to the situation when the contracting authority is obliged to cancel a procurement procedure, according to Law 98 of 2016 on public procurement. The most common situations for which a procedure is canceled are determined (mainly) by the lack of response offers or serious errors done by the purchaser that irreversibly lead to the violation of the law (The Romanian Parliament, 2016). The study of this factor is relevant in terms of evaluating how the cancellation of public procurement procedures influences the implementation calendar of LIOP 9.1 projects.

Duration of the public procurement process (D)

The duration of the public procurement process refers to the period between the initiation of project activities and the moment of deliberation and selection of the winning bidder and includes all the activities and stages specific to public procurement imposed by the applicable legal framework for the contracting authority to be fulfilled. In other words, the duration of the public procurement process consists of all three stages described above (3.1.1). Studying the duration of the public procurement process is relevant from the perspective of evaluating its weight in the total time budget allocated to the project's activities.

Project implementation duration (P)

The duration of project implementation refers to the period between the initiation of project activities and the completion of project implementation. Practically, in the case of the projects selected in this research, due to the specifics of the activities defined within them, the difference between the duration of the project implementation and the duration of the public procurement process is the duration of the executing of the public procurement contracts within the project. Studying the duration of project implementation is relevant in terms of evaluating how it is influenced by the other factors above

Influences studied

In relation to the procurement processes provided by the public procurement legislation, in order to achieve the objectives of the research, the influences that were studied were structured in five groups, presented in table no. 1.

Table no.1

<i>Influences 1 (I-1)</i>	The influence of external factors (F1, F2, F3) on the stages of the public procurement processes (S1, S2, S3)
<i>Influences 2 (I-2)</i>	The influence of external factors (F1, F2, F3) on the total duration of the public procurement processes (D)
<i>Influences 3 (I-3)</i>	The influence of external factors (F1, F2, F3) on the total duration of project implementation (P)
<i>Influences 4 (I-4)</i>	The influence of the stages of the public procurement process (S1, S2, S3) on the total duration of the public procurement processes (D)
<i>Influences 5 (I-5)</i>	The influence of the total duration of the public procurement processes carried out within a project (D) on the total duration of project implementation (P)

Research model

The research model used (see fig. 1) is inspired by the NAPP Public Procurement Guide (National Agency for Public Procurement, 2022) in correlation with the legal provisions on public procurement (The Romanian Parliament, 2016).

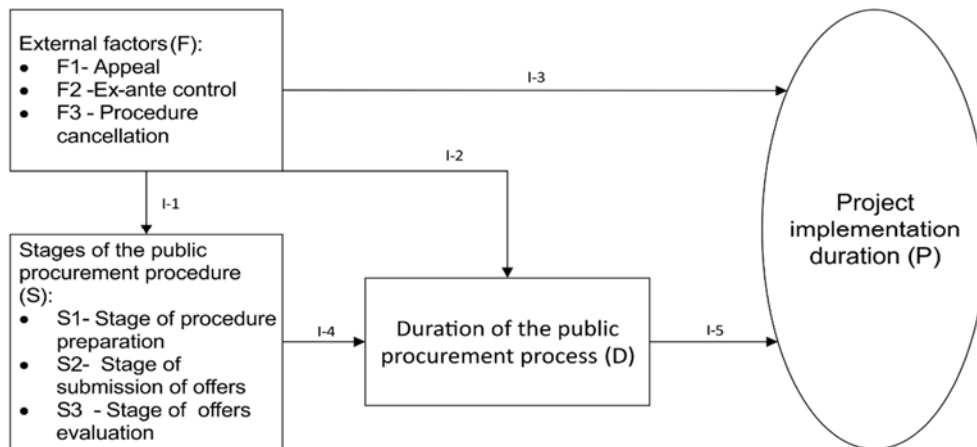


Fig. 1. Research model

Data analysis

Factor analysis

The data collected online from the MEF report and SEAP, valid on May 31, 2022, reveal that, within the 40 selected LIOP 9.1 projects, a number of 109 public procurement procedures took place, which constituted the sample of study.

For the selected public procurement procedures, the durations of the stages of the public procurement process (S1-S3) were determined and examined, analyzing distinctly the procedures that were affected by external factors (F1-F3), the results being shown in table no. 2.

Table no. 2

<i>External factors (F)</i>	<i>No. of affected procedures</i>	<i>Incidence rate (%)</i>
<i>F1</i>	18	16,51%
<i>F2</i>	3	2,85%
<i>F3</i>	12	11,01%

The average duration of public procurement processes (D) was 343 days, representing 86% of the average duration of the projects (P) within these procurements took place (398 days).

Table no. 3

	Average total sample duration (days)	Average duration affected by F1		Average duration affected by F2		Average duration affected by F3	
		days	% variation	days	% variation	days	% variation
S1	254	N/A ⁶		159	-37,4%	N/A ⁷	
S2	28	37	+32,14%	45	+60,7%		
S3	60	56	-6,6%	132	+120%		
D	343	322	-6,1%	336	-2,0%		
P	398	439	+10,3%	397	0%	450	+13,1%

⁶ The appeal (F1) is introducing in stages S2 or S3, and have no relevance in relation to S1.

⁷ Canceling a procedure (F3) leads to the cancellation of all stages of the procedure and has no relevance in relation to S1-S3.

The average values for each stage of public procurement (S1-S3) were compared with the average duration of public procurement processes (D) and with the average duration of the projects within these procedures took place (P).

The impact of factors F1 and F2 on the duration of S1-S3, D and P related to public procurement procedures in relation to the average of all selected procedures/projects are shown in table no. 3.

Influences relieved

The results of the exploratory study revealed the following influences:

Influences I-1:

The F1 factor had an influence on S2 (+34.14 percent) and on S3 (-6,6 percent);

The F2 factor had an influence on S1 (-37,4 percent), on S2 (+60,7 percent) and on S3 (+120%).

Influences I-2:

D was influenced by factor F1 (-6,1 percent) and F2 (-2 percent).

Influences I-3:

P was influenced by factor F (+10,3 percent) and by factor F2 (+13,1 percent). F2 factor had no an influence on P.

Influences I-4:

D has been influenced by S1 (having a weight in it of 74 percent), by S2 (having a weight in it of 8 percent) and by S3 (having a weight in it of 18 percent)

Influences I-5:

D has influence on P, having a weight in it of 86 percent.

Discussions

The results show that the average preparation time of a public procurement procedure consumed approx. 3/4 of the time resources allocated to the public procurement processes carried out within the LIOP 9.1 projects (see fig. 2).

The other stages (S2, S3) had comparative values with the national averages, for the procedures for awarding supply contracts, respectively 20 days for S2 and 50 days for S3 (Național Agency for Public Procurement, 2020, p. 47).

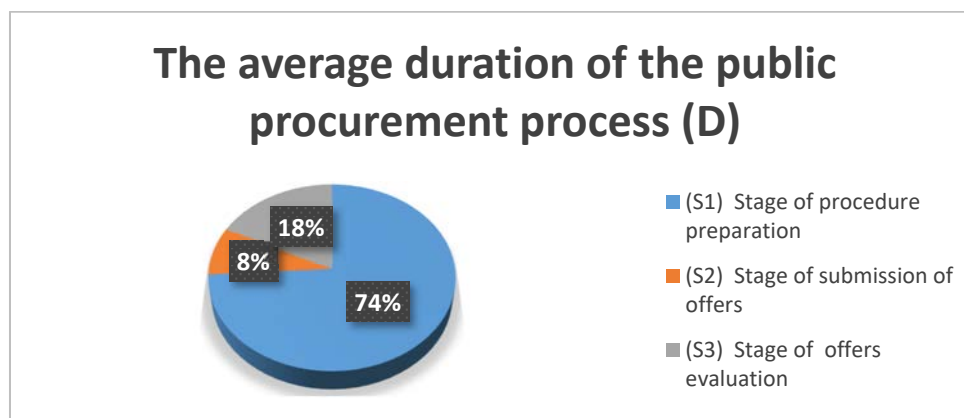


Figure 2

In the same way, the time budget of a LIOP 9.1 project was largely allocated to public procurement processes (86 percent) and less the execution processes of the supply contracts signed within these projects (see fig. 3)

The appeals (F1) led to the extension of only the tendering stage (S2), with the tender evaluation stage S3 being shorter by 6.6%. This influence, however, did not lead to the extension of the duration of the D procurement processes, but it extended the total duration of the P projects.

This situation is explained by the fact that a number of three contested procedures were also affected by the F3 factor that determined the cancellation of the procedure, the average P for them being much higher than the average of the sample (475 days)

The ex-ante controls (F2) determined both the extension of the bid submission stage (E2) and the bid evaluation stage (E3). This is happened due to the additional bureaucratic processes imposed by the control exercised by the NAPP.

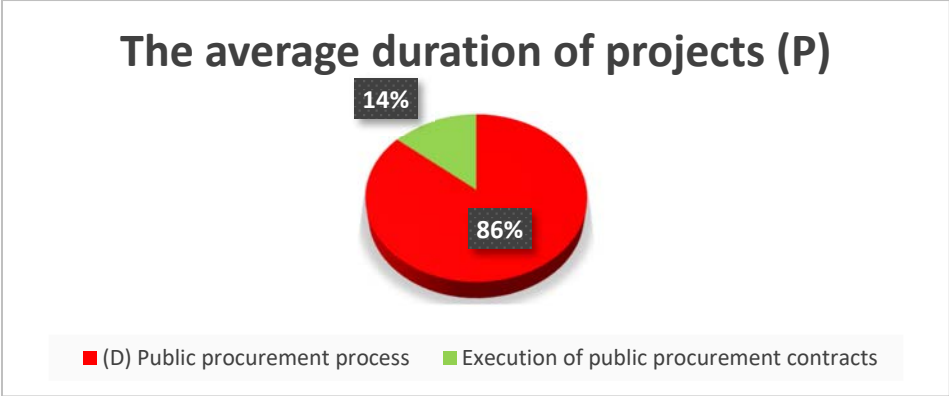


Figure 3.

On the contrary, due to the methodology applied on the process of drawing up the procedure documents, the NAPP control (F2) determined a significant decrease in the preparation stage of the procedure (E1), a fact which, through the weight held by it, determined a decrease in the duration of the entire procurement process by -2% and a zero impact on the total duration of the project (P).

In the same way, the appeals (F1) and the cancellation of the procedures (F3) had a negative impact on the total durations of the implementation of the projects P, according to fig. 4. The ex-ante control (F2) had no influences of the total duration of the projects.

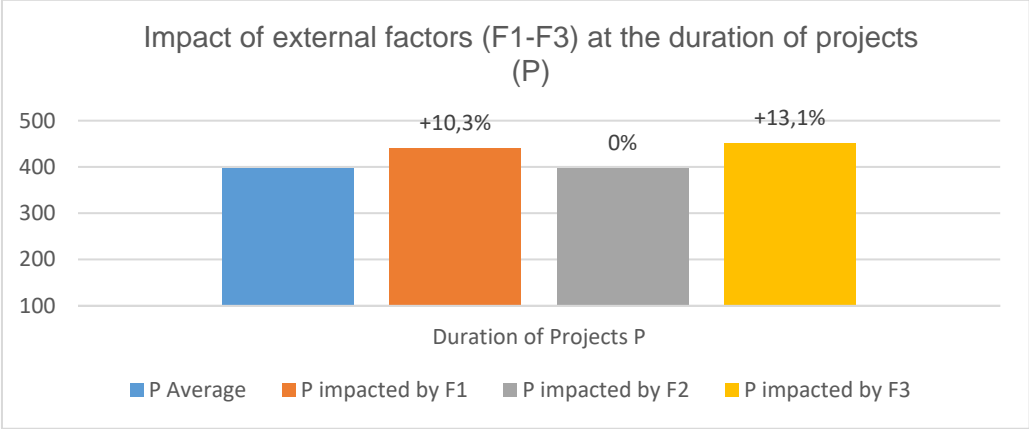


Figure 4.

Conclusions

Synthesis of research results

In response to the research question, we consider that the duration of the POIM 9.1 projects circumscribed to our study was majorly affected by the stage of preparation of procedure.

The fact that the average duration between the initiation of the projects and the completion of the procurement within the projects was almost an year (343 days), we consider that the "Timely and efficient response of the public medical system to the COVID-19 crisis" pursued by the financier through the financing of the LIOP 9.1 was delayed mainly by the activities allocated for preparing the procurement documents.

These explain mostly the reasons why the implementation period of these projects, which contribute to the speedy removal of the effects of a health crisis, was extended until the end of 2023, probably beyond the horizon in which this crisis will produce effects that require the procured products.

The impact of appeals and Ex-ante NAPP controls on public procurement procedures circumscribed our study had added further delays on project implementation periods by max. 52 days (max. 13%).

It is clear that without intervening on the elements that led to the negative influence of the calendar of the projects analyzed, the future financing measures that aim to remove the effects of some crises will suffer in the same way as those in our study.

Contributions of the study

This study relieved how each stage of the procedure and each factor negatively influenced the total durations of the public procurement processes as well as the total durations of the implementation of LIOP 9.1 projects sampled.

The research model chosen and the influences studied within the research allowed the identification, collection and processing of data through direct comparative analyses.

The results of the study provide both theoretical and empirical results regarding how the implementation of EU-funded projects are affected by the public procurement processes carried out within them.

From an academic perspective, this paper adds more knowledge on how the stages of public procurement processes and the external factors that influence them are connected with the calendar of the projects within which they take place.

Managerial implications of the research

From a practical perspective, the study provides a useful picture for decision-makers involved in project management, respectively suggesting to them an appropriate prioritization of time resources and adequate risk management.

At the same time, the results of the research help the responsible authorities to identify concrete ways to reduce the preparation times of the awarding procedures taking place within the framework of EU projects.

Another advantage offered is the fact that this research offers the people involved in the design and implementation of EU projects a starting point in their own analyzes and evaluations regarding the planning and running of the activities within these projects.

Research limits and future research directions

The research did not fully cover all 159 LIOP 9.1 projects. At the time of this work 119 LIOP 9.1 projects are still in the course of implementation, respectively the public procurement portfolios within them are in various stages of development, a fact that did not allow us to find out what are the delays recorded in these procurement portfolios.

At the same time, the team could not identify the specific causes that caused the delays in the preparation stage of the award procedures, nor the specific reasons that led to the submission of appeals or the cancellation of the procedures.

Because this research aimed only on projects that were financed through LIOP 9.1, we intend to continue the research also at the level of other financing programs as well as other types of purchases (services or works).

Last but not least, the data collected thru the research made us to believe that in-depth research is needed regarding the concrete measures that can be adopted within specific financing measures, to reduce the deadlines for public procurement, such as the establishment of standardized bid documentation or the development of procurement guidelines specific to certain types of EU financing/projects.

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FROM THE PASSIVE PLURALIST HOUSE TO THE MODERN nZEB, DESIGN AND APPLICATION CONSIDERATION FOR A BETTER PERFORMING LESS COSTLY ENERGY EFFICIENT HOUSE

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Abstract

Purpose – *The paper presents a series of managerial and economic considerations related to the construction of passive houses.*

Methodology/approach – *This article identifies three distinct generations of passive house: The Pluralist Passive House (PPH), the Modern Passive House (MPH) and the Net Zero Energy Building (nZEB), developed over the last five decades.*

Findings – *Relation between surface, volume, and energy, which represents the main part of the research, was concretized by determining a mathematical relationship, which is in the process of obtaining the copyright.*

Research limitations/implications – *The research was carried out under laboratory conditions.*

Practical implications – *The research results can be applied in the construction of houses and industrial halls.*

Originality/value – *The research is original, and the mathematical relationship determined is in the process of obtaining the copyright.*

Key words: nZEB, Compactness, Energy.

Introduction

The Passive house concept has developed in the Early 1970's in the background of the world's energy crisis. Since then, different types of passive houses have been developed, mostly in West Europe and North America. Today of the total energy generated, a third to half of the consumption is associated with household. As reduction of energy consumption, use of renewable energy, and reduction of emissions are becoming a priority, sustainable living based on the passive house and nZEB (Net Zero Energy Building) are getting more attention and becoming mainstream.

This article reviews three aspects of the Passive house/nZEB off the grid design. First - Historically, identifies three distinct generations of passive house: The Pluralist Passive House (PPH), the Modern Passive House (MPH) and the Net Zero Energy Building (nZEB), developed over the last five decades. Second- the effect of the compactness ratio (size and shape) over the thermal performance on the nZEB design. Third and final, presents a series of managerial and economic considerations related to the construction of the grid nZEB design.

From the Pluralist Passive House to the Modern nZEB

Since the turnover of the 20th century buildings and technology has evolved significantly. Electricity and light have changed buildings from being dependent on natural resources, like light through windows, to controlled environment (Rowan University, 2017).

In the early 1970's in the period of the energy crisis in America a solution for a more energy efficient house was sought. It was the answer to increasingly high costs of energy bills.

The first countries to have realized passive houses were countries with cold weather who were affected mostly of the energy crisis. The Saskatchewan conservation house in Canada 1975-1977 (Passipedia Organization, 2017) - probably the first recorded Passive house in a modern definition - applied common construction solutions to reduce cost of energy.

Another example of an early PPH is The Massachusetts conservation house 1973-1977. The PPH applied a better solution to an existing building method. It was a natural step for a better performing house and was based on existing technologies “Draw a pie as the total consumption of a house” says Orr. “You divide it in three equal parts. One third of it is losses through the windows, the walls, and the ceiling. One third is heat loss through the basement. And the other third is air leakage.” (Office of Energy Efficiency & Renewable Energy, 2017).

The process and the design were not of innovation technology wise. It was rather, a better application of the existing methods of construction at the time. Elimination of basement, increased wall thickness and added insulation, efficient orientation of windows towards the sun. During the 1980's another important technological advance, allowed for more energy efficient solution the double-glazed window. The new window type helped control the climate inside the house (Eley, 2016).

Later the development of LED light made another technological step. It helped reduce the heat generated by conventional light bulbs and significantly reduced the energy consumption (U.S. Department of Energy, 2012) and (Navarro, 2012). With solar power technology and a proven concept of a passive house-a new era of passive house was born. The Modern Passive House MPH. The new modern Passive house began developing with the new technologies into a new direction-house systems and improved building envelope. In addition to the methods implemented in the PPH, the MPH implemented multiple technologies and better building systems, reducing energy consumption.

By 2005 global heating, carbon footprint. It became a world known problem affecting most of the world's population. Awareness, increased demand, demand implemented code, for better performing houses, leading to the generation of the modern nZEB. Not only a passive house that relies on better application of existing building methods and new technologies, but a house that is able to generate free energy, offset completely energy costs, and rely heavily on technology to significantly reduce the carbon footprint and energy consumption.

Compactness ratio review

The size and shape of forms and the effect of the energy is a long-known phenomenon in thermodynamics. In the world of Passive house design achieving nZEB is a high threshold. one of the best practices achieving Net-Zero, is reducing size to reduce energy consumption. Geometry and compactness are main design considerations in passive house. Specifically, different aspects of the compactness ratio or described as the surface to volume ratio. Following a discussion, the importance of achieving a compact house design, to reduce consumption significantly. Compactness ratio, or surface to volume ratio is a classical problem in the world of building. It is a heavily viewed subject, especially in the nZEB aspects. It has been discussed for half a century now. This problem gets increased attention as building codes for energy performance are increasing in Europe and in the US (Wright and Klingenberg, 2015), (Holton, 2012), (Dimetrosky, Parkinson and Lieb, 2014), (Industry Alliance, 2013), (Edelson, Cheslak and Urbanek, 2021). In the early days of the first examples of passive house, (such as the Saskatchewan Conservation house 1975 some basic principles proved to be very effective - decreasing the house size and eliminating the basement. These principles are still applied today for MPH and nZEB (Ben-Senior, Ungureanu and Banica, 2019), (Ben-Senior, Ungureanu and Banica, 2020).

In 1979, in the article “The Saskatchewan Conservation House Some Preliminary Performance Results”, the authors, explains how the high-performance passive house was achieved. He mentioned the importance of size and ratio to consumption of different examples built in Denmark and Toronto (Besant, Dumont and Schoenau, 1979).

In earlier example projects (Anderson and Riordan, 1976): “As early as 1939 a 100% space heated structure was constructed at the Massachusetts Institute of technology. For two years it operated requiring no auxiliary heat... The relatively small collector area to floor area ratio, and water storage volume to house volume ratio, achieved the desired result. The Saskatchewan Conservation House are due to several factors... the space heating load has been reduced to about five Gigajoules per year” the

application of a reduced footprint with renewable energy sources as solar heat collectors and water storage proved to be a good practice for passive house.

In 1981 Givoni writes in his article "Conservation and The Use of Integrated Passive Energy Systems in Architecture": "The term layout in this context refers mainly to the compactness or otherwise of the house plan. The main impacts of layout from the energy point of view, is its effect, on the one hand, on the envelope surface area and, on the other hand, on the potential for natural ventilation. As the house plan is more compact the surface area of the walls, for a given floor area, becomes smaller. As a result, the heat exchange by conduction between the house and the ambient air is decreased... the smaller surface area reduces the energy demand of the house..." "The architectural aspects which have an impact on the thermal behavior of the building and its indoor climate and thus on human comfort and energy requirements" Givoni concluded a direct relationship between the compactness to the reduction of energy consumption. Further in his article he associates energy performance and reduction of consumption with other methods such as solar radiation, nocturnal outgoing long wave radiation, night convective cooling, evaporative cooling (Givoni, 1981).

In 1987, in his book, "Fundamentals of Heat Transfer (1987)", Alan J Chapman, wrote "The shape and orientation of bodies is long known to have effect of the direction of convection and heat flow." While heat exchange by thermal radiation does not depend on a transport medium, the geometric configuration of bodies exchanging heat by this mechanism is quite important. The amount of the radiation emitted by one body that is intersected by another is highly dependent on the size, shape, and relative orientation of the bodies", the discussion is attached to the Boltzmann equation (Chapman, 1987).

In 2005, in his Article, Al-Bahi, et al., is describing the effect of natural convection in a tilted rectangular enclosure. Specifically, with ratio of width to height of 1:5 of which is then describing the effect of the ratio on the convection when and how the ratio is affecting the Nusselt number as a result of inclination. "The maximum Nusselt number is found close to the vertical orientation while the minimum is at the horizontal position with fluid heated from the top for which convection is effectual and the average Nusselt number is greater than unity." The boundary condition., the ratio and shape affect the conductive to convection ratio (Al-Bahi, Al-Hamzy, and Zaki, 2005).

In 2009, Kimmo Lylykangas, writes in his article is mentioned surface to volume ratio and the importance of shape factor in energy consumption. He demonstrates different ratios performing differently and the approach to design as the consideration of the shape factor (Lylykangas, 2005).

In 2011, Rodriguez Gonzales, et al. [20], mentions in her article the need to create Energy efficient Index for buildings under new energy consumption policies. The index value is based on the ratio between the energy consumption to the surface. It does relate to the consumption to the volume. The Author makes a valid point of importance of indexing the performance of different buildings in relation to the growing need for reducing energy consumption (Rodriguez Gonzales, Vinagre Diaz, Caamano, and Wilby, 2011).

In 2014 in the article "Energy Efficacy Evaluation of Zero Energy Houses", the authors, are mentioning under passive design geometric and ratios as one of the key components in achieving government directives of reducing energy and pollution reduction by creating a low energy building (Rodriguez-Ubinas, Rodriguez, Voss, and Todorovic, 2014). "Energy efficiency contest is mostly related with three juried contests: Architecture, Engineering and construction and sustainability..." the design is related in the article to the interior comfort and functionally of the house. "The passive design method is directly associated with the thermal performance of the envelope. "In addition to the house envelopes, there are other strategies to accomplish a high energy efficiency performance... The volume of the building can be used to achieve greater energy efficiency for the entire life cycle of the building". The contest included eighteen projects. The methods of achieving high energy performance were made by creating, six different categories: (1) passive strategies, (2) thermal energy storage, (3) hybrid systems, (4) active conditioning systems, (5) hot water, (6) other energy efficiency solutions. Passive strategies group included twenty-two methods of achieving energy efficiency, however none of which included nor applied, ratio, compactness, layout, or similar factors.

In 2019, Vallejo-Coral and his coauthors describe a theoretical and experimental method of calculating factors for calculating cooling loads for buildings in warm climates (Vallejo-Coral, Solorio-Rivera, Gijon-Rivera and Zuniga-Pueblo, 2019). The article aims to determine CLTD values for roofs and walls. The experiment proves good practice, and the results are highly in agreement with other results of a project

conducted in Turkey as well ASHRAE methods. However, the method provided is based on a two-dimensional form (wall or roof) and is based on geographical specific conditions, meaning, precipitation, latitude, longitude, and temperature. The method does not provide a physical formula to explain the entire performance of the thermal load changes regardless to their location and in respect to total effect over the entire house rather than a specific wall. Specifically, the calculation and coefficient are all related to a two dimensional and do not account for changes happening in the captured volume as departing from the exterior wall. The experiment is limited to the surface of the wall (interior and exterior) rather than the captured volume of air inside the house. The assumption of the model is that surrounding temperature of different surfaces are equal to outdoor temperature which intends to say, that the wall section assumes constant one temperature through its entire height (?) How does this assumption affects the results? The wall's temperature, is highly likely to be different at its base than at its roof when exposed to sunlight due to conduction added heat from the ground, absorbed radiant heat etc. On the other hand, the performance accounts for the accumulated behavior of the effect of convection as well as conduction. Which does provide a more realistic image of the results.

The above literature review is making the case clear. In different fields of research there, is a clear consensus over two basic principles:

One - there is a bond between surface, volume, and energy.

Two - regardless to the form, of which energy, specifically heat, presents itself convection, conduction, radiation, energy is affected by the shape direction and orientation of shapes.

Each and every result above is valid in its field and adds a new perspective. The results raise the following question: how does the surface, volume, and energy can be harnessed in the field of passive house design and construction, into one method of design, to generate a better performing sustainable living space, reducing pollution and energy consumption? For this, experiment is proposed: build different houses in different shapes and ratios, measure the energy consumption in comparison the atmospheric conditions and establish the most efficient method. My experiment measured the ability to retain heat of different shapes and different volumes under the same conditions. The results are clear. Different shapes and different volumes retain heat differently over time.

Table 1. Experimental results

Cube	Size [inch]	Average time to retain heat [min]	$\Delta^{\circ}\text{C}$	Temperature loss rate/min
Cube A	26/26/26"	398	20	19.90
Cube B	35/35/35"	377	20	18.85
Cube C	50/50/50"	272	20	13.60

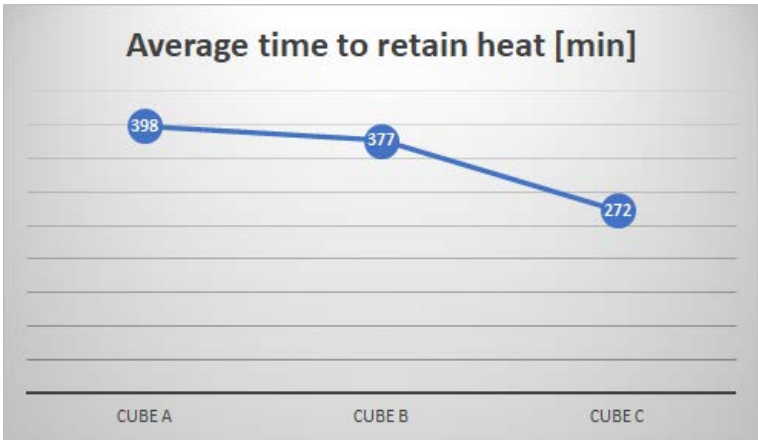


Fig.1. Temperature loss over time of different cube sizes

The smaller the cube the faster it loses heat. In other words, the ability to retain heat is opposite proportional to the size of the cube. This principal should be applied in the field of design. Design small houses with high compactness ratio. To make the experiment practical, one dimension - the height need to be constant and fixed - the height of the ceiling. That is to allow the space to be usable. The proposed heigh is 250cm. Naturally, high insulation materials, sun orientation and other geographical considerations will contribute further to the performance of the house to sustain itself off the grid.

Financial and managerial aspects of nZEB

During our research regarding the subject, it became evident that building a high energy efficient house is more expensive than the traditional method.

Some of main reasons are:

First, high energy efficiency requires more insulation, better building materials, cutting edge technology in reducing energy consumption, high performing appliances, and mechanical systems. They all are requiring a bigger investment comparing to conventional average of the shelf solutions.

Second, less air leaks, better insulation and multiple building systems integrated into one household requires highly trained labor and more attention to detail during construction. In other words, highly trained specialists instead of common construction labor and longer building time. Both increase to the cost of construction.

Third, to meet the definition of nZEB or Passive house, in addition to all the expected household appliances and systems, the newbuilt, is required to have green energy harvesting system, such as windmill, solar panels etc., which adds to the cost of conventional house.

Increasing the cost of construction reduces the accessibility of the masses to better performing energy house. to offset the increased costs and increase scalability, one proposed solution is off site manufacturing. Instead of one design at a time, it is proposed to utilize specialty designers for multiple stock plans of different houses plans. Considering all the necessary design methods in advance from building systems, insulation, and windows. Then, to premanufacture off-site.

Metal Structural Insulated Panels (MSIP), offer a full design and manufacturing in a controlled environment. Then shipping the complete project to the site, ready to assemble. MSIP technology (<https://thermasteelinc.com>, 2019) offers the structure, sheathing, vapor barrier and insulation all in one. The project arrives to the site with all the accessories, plates, and screws ready to assemble, just like big building block. The units are about 25kg a piece of 4 sqm allowing an unexperienced team of three, to assemble a full house in three days. Cutting the labor from four trades to one trade and from months to days.

Scalability, premanufacturing and high efficiency method are the key factors to reduce cost and make the nZEB model available to the masses at a lower cost.

Discussion and conclusions

The present paper contains part of research from PH.D. work entitled Research on Optimization of Technological Solutions of nZEB House.

In the first part of the paper, a brief but detailed description of the nZEB house concept is presented. The reference works in the field are presented with the concrete specification of the contribution for each of them.

The research carried out within the doctorate have highlighted two main directions:

- ✓ The relation between surface, volume, and energy, which represents the main part of the research, was concretized by determining a mathematical relationship, which is in the process of obtaining the copyright.
- ✓ In addition to the established relationship, other parameters influencing heat transfer were identified: shape direction and orientation of shapes.

Some of the research results are presented in the table and graph in the paper. Analyzing the experimental results, it follows that cube A presents the best properties.

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STAFF MOTIVATION IN CRISIS SITUATIONS AND MANAGEMENT ACTION TO IMPROVE THE ORGANIZATION'S PERFORMANCE

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Abstract

Purpose – *The article examines the relationship between motivation influenced by crisis situations and the improvement of organizational performance under direct involvement of central management.*

Methodology/approach – *Both qualitative and quantitative approaches were employed by means of observation, regarding staff relationships in the unfolding of crisis situations, and by data collection and interpretation of results of the questionnaire applied to the participants of the case study within the organizational context, correspondingly.*

Findings – *Management involvement in the specific manner of direct and unmediated action in the activity of the staff, whose motivation is likely to be influenced in order to ensure favourable conditions for the achievement of the organizational objectives, proved to be effective by improving the expected performance.*

Implications/limitations – *Within organizations, procedures and algorithms are provided for carrying out activities when hypothetical situations arise with the potential to influence the achievement of objectives and affect organizational performance; however, these measures fail to provide an actional model of management in crisis situations generated by armed conflict.*

Value – *This study rises awareness on the importance of enhancing performance of crisis management as regards the cognizance of the psychological profile by categories of staff and of their generic motivation.*

Key words: *crisis management, motivation.*

Introduction

In crisis situations, people are subjected to psychological stress that influences their behaviour in all areas of their activity. Their behaviour within the organizations in which they operate undergoes changes to the extent that their motivation as part of an organizational culture, it either leads them to adopt a positive attitude to participate in the organization to face the crisis or to shelter and save themselves.

Obviously, motivation is in the management's attention, and in order to maintain it with a view to continue to achieve institutional objectives, management must use certain levers of action to exploit its advantage in the direction of improving the performance of the organization.

Crisis changes the working conditions in the organization by creating situational elements that affect the achievement of objectives and performance. Mere staff motivation to overcome the obstacle does not guarantee met objectives and achieved performance. Management levers make the difference in achieving the organization's aim.

Performance represents a superior value achievement compared to the level reached at a given time, under conditions of effectiveness, efficiency and necessity, in the process of fulfilling the pre-set objectives. Conducive to achieving this goal, management seeks the most appropriate ways and means of action and exploits all the opportunities that arise, being permanently interested in maintaining its high level of involvement in the organization.

Organizations respond to such challenges based on the goals pursued in the areas in which they evolve. To this extent, Preda (2006, p.17) considered that “any organization is a rational, institutionalized form of interaction of a group of people, justified by the interest (or pretext) of achieving a common goal.” Correspondingly, Talbot (2019, p.2) claims that public organisations (with reference to departments and ministries, units, programs, systems, etc.) “sit at the intersection of the interest in organizational effectiveness and performance generically and interest in the performance of the public sphere as a whole”.

Crisis is a state of tension that affects parts of or the entire society, with repercussions in all areas of activity. These states involve a great psychological burden that affects the routine of the individuals' lives in all areas of their existence.

What drives people to achieve their aspirations, to overcome the obstacles that get in their way?

Inner stimulation, ambition, and spirit of competition lead individuals to act in the direction mentioned above. This takes on a sense of motivation. Moreover, Indahingwati et al. (2019, p.25-34) state that motivation is the power that enables one to act towards a particular goal.

Could individual motivation ensure performance achievement?

Organizational performance involves achieving a high value threshold in terms of the level of objectives achieved, but this involves a corresponding management of the organization. Individual motivation has an influence on facilitating performance, although it is not a determining factor. Accordingly, Kreitner et al. (1999, p.123-137) argue that although motivation is a necessary contribution to job performance, it is not exclusive. Along with this, a level of skills, knowledge of how to complete tasks, feelings and emotions, conditions of inhibition or facilitation that are not under one's control, etc. are also required.

The **state of armed conflict**, the crisis with the highest degree of tension, affects motivation to such an extent that the individual becomes part of the organization that ensured through organizational culture, the satisfaction of ambition, inner stimulus, the fulfilment of an aspiration, of a self-achievement.

By affecting the smooth development of the activities, the situations created by the crisis lead to the hindrance to the achievement of the objectives under related conditions, and implicitly, to the achievement of the organizational performance. The level of performance is given by the conditions that allow it to be achieved. Basically, management tend to improve the level of performance allowed by difficult conditions, so that it reaches the predictable level achieved under normal conditions. This can be defined as **improving performance**.

Case study. Context

The launch of the military aggression by Russia had as immediate impact the migration of an impressive number of people, mostly Ukrainian citizens, from Ukraine to the EU Member States, the most affected countries being Poland, Hungary, Romania and Slovakia. Most refugees used the *visa free* regime to enter and move within the EU, with very few applying for a form of international protection in the first-entry States. The adoption of Council Implementing Decision (2022) of the EU Council which acknowledges a massive flow of displaced persons from Ukraine within the meaning of Article 5 of Directive 2001/55/EC with the effect of introducing temporary protection created the premises for balancing efforts between Member States, ensuring the Ukrainian citizens the rights of residence and work for at least 1 year.

This specific context led to the involvement of border guards on the eastern border of the European Union in an unprecedented way.

The sudden increase in traffic values, the multitude of atypical procedural situations, exposure to the human drama of refugees, the shortage of resources and personnel are just some of the difficulties faced by border guards at border crossing points. Even though, the border police ensured the successful management of the challenges corresponding to this period as the institution's management made use of action levers that led to the exemplary mobilization of the law enforcement forces.

Research design

This study reproduces the structure of post-action analysis sessions, designed specifically for the specific environment, which answer questions such as:

- a) What were the expected outcomes?
- b) What outcomes could actually be achieved?
- c) What facilitated the achievement of outcomes?

Psychological (motivational) mechanisms were investigated, but also institutional levers used in crisis management. The sample of participants consisted of 46 employees: 84.8 percent men, 15.2 percent women; 45.7 percent of them were in management/coordinating positions; 54.3 percent were professionals in execution positions (21 officers and 25 agents). All (100 percent) carried out their activity in sectors with border crossing points, located on the border with the Republic of Moldova (which were characterised by increased pressure from the perspective of traffic values).

All the management factors within these structures (head and deputy structures, head of border crossing point and five or six employees in executive positions (appointed by statistical step of five), were selected to participate in the study, known as distinct for their involvement and the outcomes in the activity carried out in the entire period since the beginning of the armed conflict in Ukraine.

Research results and data interpretation

The main interest of the study is identifying the main difficulty that a border crossing points employees faced in the context of the armed conflict in Ukraine. As shown by the analysis of the results presented in the table below, the difficulties reported of by the respondents referred mainly to **the atypical nature of the situations encountered, their unique character** (43,5 percent), **doubled by the pressure exerted by high traffic values** (34,8 percent).

Table 1. The main difficulty encountered in my professional activity at the border crossing point during the last month

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	high traffic values	16	34,8	35,6	35,6
	the multitude of unregulated situations / incidents / that exceed work procedures	20	43,5	44,4	80,0
	the presence of persons not directly related to border police work at the border crossing points	1	2,2	2,2	82,2
	lack of resources (material, human) necessary to carry out the activity	4	8,7	8,9	91,1
	situations that affected me emotionally	4	8,7	8,9	100,0
	Total	45	97,8	100,0	
Missing	System	1	2,2		
Total		46	100,0		

The study is meant to identify aspects the employees considered helpful in dealing with the consequences of the Ukrainian crisis. The right dissemination of their performances makes it possible to replicate a successful actional model in similar situations or to substantiate some approaches to optimize problematic or dysfunctional aspects.

Professional training of employees (M=2,58) was ranked on the first place among the resources mentioned by the border crossing points staff, followed by **the support provided by the superiors** (with reference to the central management from the organization's headquarters), stress resistance, the support offered by colleagues, family support, physical resistance. On the last place is the previous

experience in crisis management and the resources (human, logistical, time) on which they could rely in performing specific tasks.

The *T-test for independent samples* revealed statistically significant differences between management positions and execution positions in relation to the support received from their superiors (in the sense that respondents in management positions evaluate the support received from the management as being more consistent in relation to those in executive positions, $t=-2.05$, $DF=43.41$, $p\leq 0.05$, which indicates that, at least at the level of subjective perception, middle management has received more organizational support than it provided).

There are also statistically significant differences in the sense that superiors believe that physical resistance helped them more during this period compared to their subordinates ($t=2.37$, $DF=42.63$, $p\leq 0.05$), whereas the latter perceived support from the family as stronger than that felt by their superiors ($t=-1.94$, $DF=35.56$, $p\leq 0.05$).

The research design is based on the hypothesis that the results obtained by employees should not be motivated by obtaining rewards or avoiding punishments, but by factors associated with intrinsic motivation, a concept discovered by researchers in the mid-20th century. According to Pink (2011, p.149) three main elements favour people's involvement in action: "autonomy, the desire to direct our own lives; mastery, the urge to get better and better at something that matters; and purpose, the yearning to do what we do in the service of something larger than ourselves."

Encouraging professional performance by stimulating intrinsic motivation is based on autonomy, in terms of tasks (what I do), time (when I do), team (with whom I do) and method (how I do). In highly hierarchical structures such as those of safety and public order, including the institution, one could only discuss autonomy in relation to the way specific tasks are performed (the team, the time and the type of task are not under the employees' control). An amount of 80.5 percent of the study participants stated that they were able to organize their own way of performing tasks to a large and very large extent during the armed conflict in Ukraine.

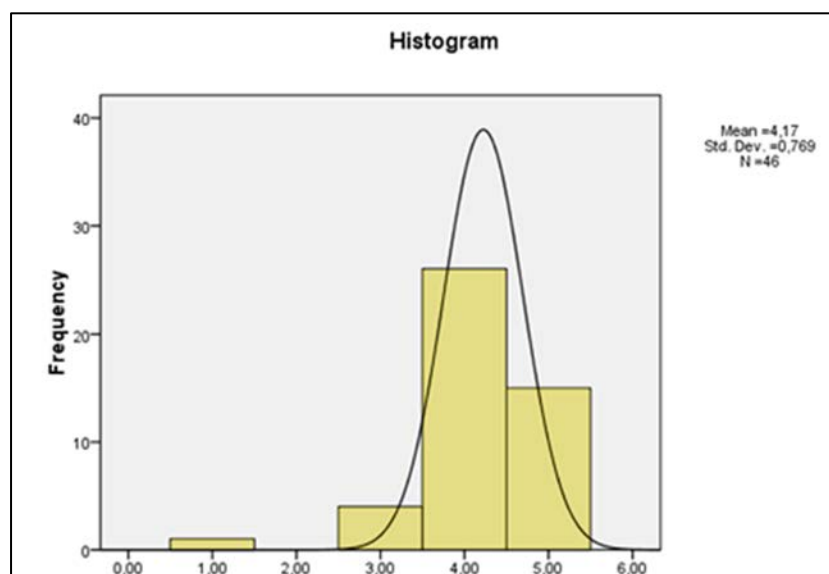


Figure 1. I consider that after this period, I was able to organize my own way of carrying out tasks.

Mastery involves, according to Pink (2011, p.233), exposure to challenges adapted to one's own abilities, which are "infinitely improvable, [...] involving effort, grit and deliberate practice" (158). For this reason, 83,1 percent of the employees surveyed believe that their professional experience helped them to become better.

Last but not least, the feeling of serving an objective superior to individual interests is present in 65.2 percent of respondents' answers. In the case of the crisis in Ukraine, the purpose of the work of border crossing point staff was an implicit one, immediately understood and having both professional and humanitarian character ("We are here and we are doing everything in our power to help these people

run away from the path of war", "We put all our knowledge into practice to prevent those who take advantage of the context of war to commit illegal acts".

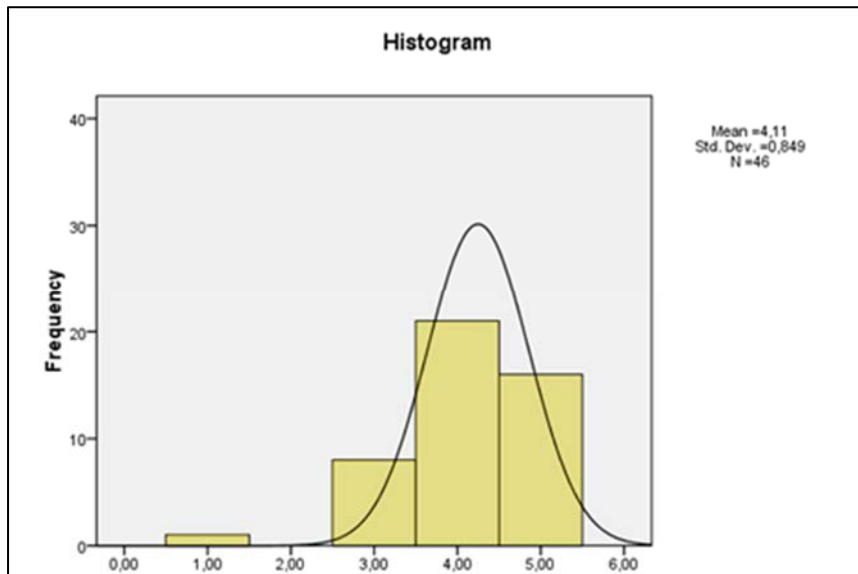


Figure 2. I am a better border guard.

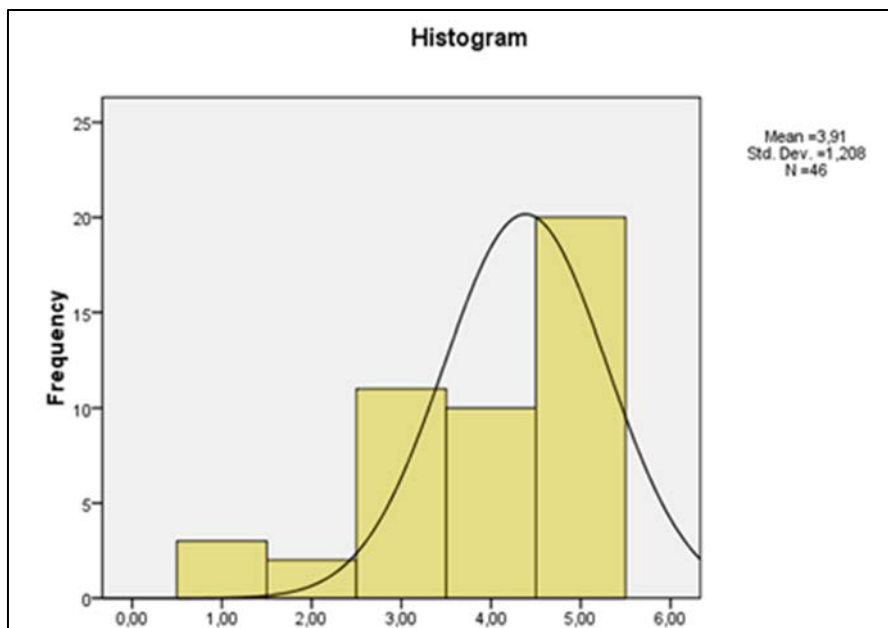


Figure 3. I feel that my work serves an objective superior to my personal interests.

Modulation of intrinsic motivational factors was achieved by implementing measures aimed at creating a sense of belonging, connection and safety at the group level.

To this end, **the superiors consulted their subordinates in decision-making, worked side-by-side, providing a personal example** (78.2 percent believe that this happened to a large and very large extent), **showed their availability to answer questions, in a non-normed schedule** (80.4 percent), **asked for and provided constructive feedback**, and errors were evaluated as contexts for learning and development.

There is therefore a positive polarization of all attitudes that increase motivation for involvement in the activity. These behaviours made it possible to agglutinate work teams and strengthen the belief that "We are close, we are safe, we share a future". (Coyle, 2018, p.45)

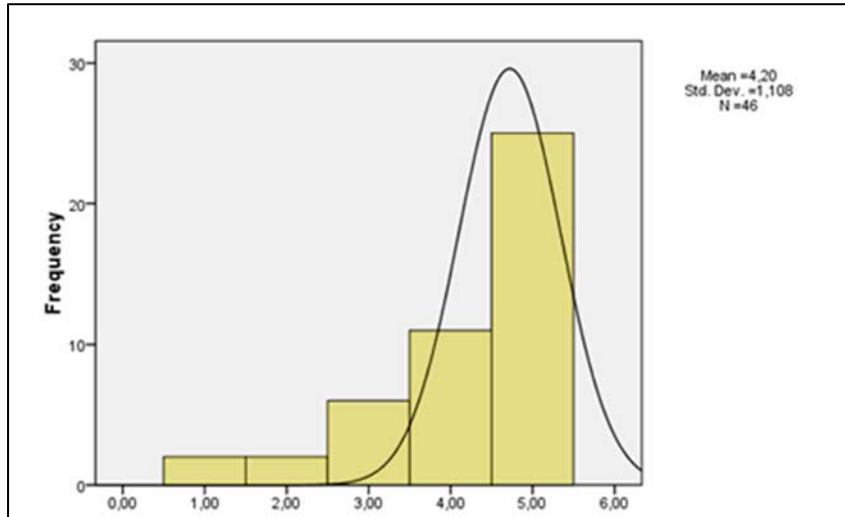


Figure 4. My superiors worked with me side-by-side, providing a personal example.

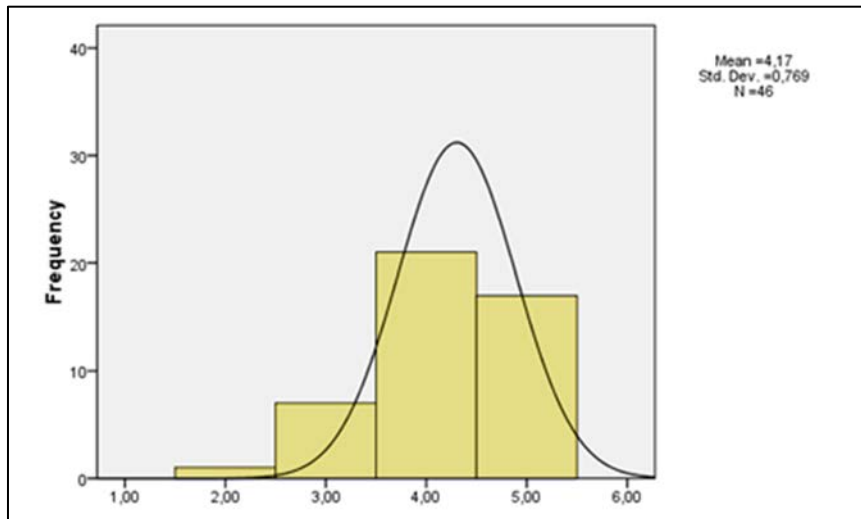


Figure 5. I feel that I have someone to learn new things from, I have people around who inspire me.

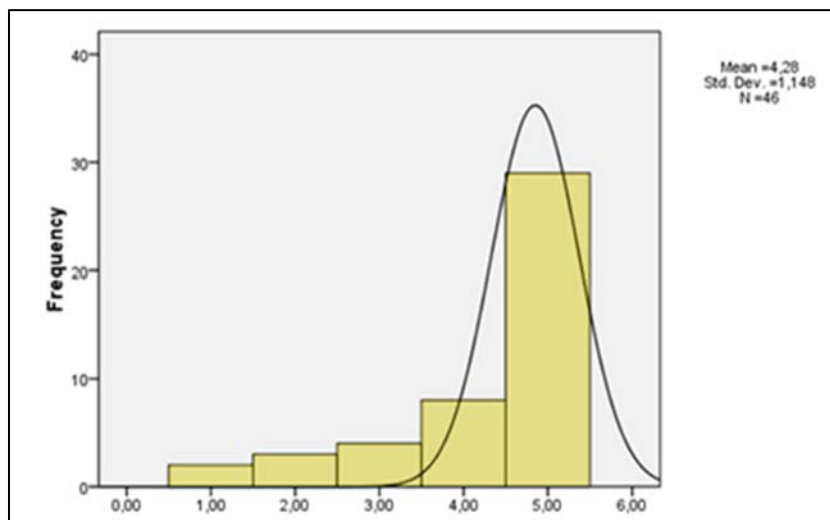


Figure 6. The managers were available to help me in making decisions, including out of working hours.

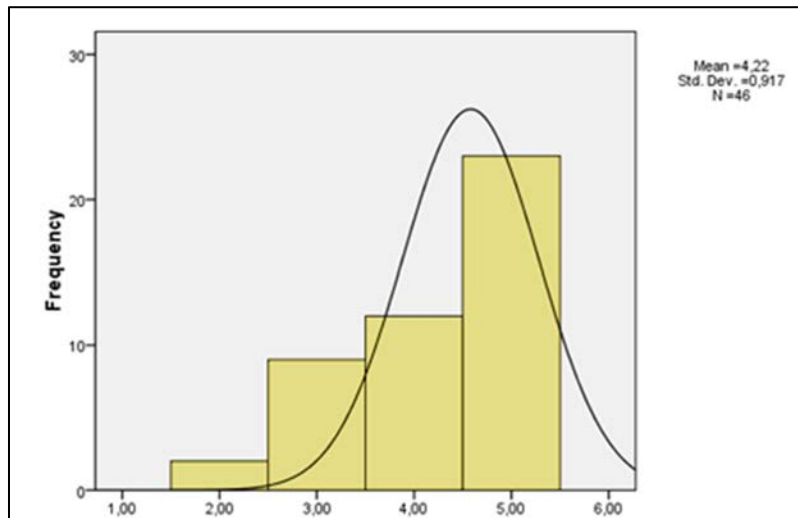


Figure 7. I received positive feedback.

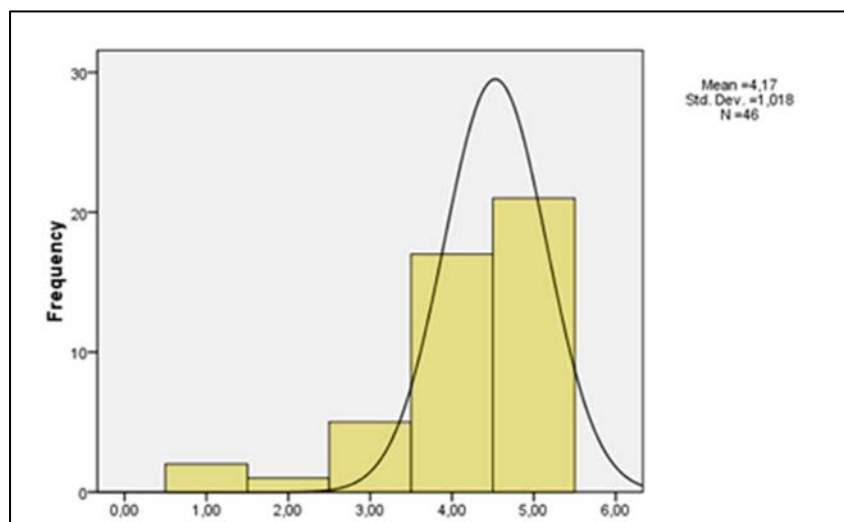


Figure 8. My superiors made me feel that my work is appreciated and valued.

Conclusions

The research material provides with an answer in terms of the necessary strength that stimulates the organization's activity in a crisis situation. Managers need to be fully aware of the elements of organizational culture crisis (slogans, logos, principles) in order to be able to activate them intensively in crisis situations.

An essential thing to ensure the success of organizational objectives was knowledge, training and skills trained by staff, which should be a permanent priority for management. The most obvious factor that represented a strong lever in stimulating activity in crisis situations was management support.

What did that consist of?

It consisted of direct participation within the organization, achieving direct communication between the top of the hierarchy and the basic level on which the achievement of organizational objectives directly depended. Another aspect was the specific qualification for such situations so that management not only had the role of directing and supervision but also was directly involved, where appropriate and cogent among the basic level, in working teams, identifying together solutions to overcome obstacles and optimize the activity.

The staff inner motivation was strengthened through physical presence, by direct taking over of the newly emerging problems by the central management, and also through organizational culture elements such as: "we are here on the front line", "this is what we trained for". Thus, they succeeded to fulfil the organization's objective of maintaining constant and continuous border surveillance and control.

In conclusion, in order to achieve the success of the improvement of organizational performance, management must be directly involved within the organization's mechanism and directly tackle the problems arising in specific crisis situations. In future crisis situations, management will have to consider the need for its mobility at all levels of the organization and ensure direct and unmediated communication with the personnel involved in ensuring the achievement of the organizational objective. Furthermore, it would be appropriate for the members of the central management to take on the role of specialists in specific fields, by creating a sense of trust of the staff led in the institutional capacity to overcome obstacles.

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THE EFFECT OF THE COVID-19 PANDEMIC ON EUROPEAN ECONOMIES

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Abstract

Purpose – The study aimed to analyze the effect of the COVID-19 pandemic on the evolution of macroeconomic indicators: Gross Domestic Product, Gross Value Added, Final Consumption Expenditures and Net Export in the years 2018-2021.

Methodology/approach - To carry out the study, the existing data in the Eurostat database were processed, obtaining the weight of each country at the level of each indicator, the average value at the level of each year and finally the differences between years.

Findings – Following the comparative analysis, it was observed that the effect caused by the COVID-19 pandemic determined in some countries the increase but also the decrease at the level of the indicators.

Research limitations/implications – The paper analyzes the existing data without being able to associate the value differences with the anterior socio-economic conditions or to efforts of economic agents or governments by the pandemic period.

Practical implications – The paper allows tracking the changes at the level of each indicator and country, which determines an overview of the situation in the economies of the countries studied.

Originality/value – The analysis carried out compares the results obtained by the economies of several countries, which faced an unprecedented situation and which, according to the observed effects, managed differently.

Key words: economic situation, effects of the COVID-19 pandemic, evolution.

Introduction

The design of workplaces has changed over time as a result of the evolution of information and communication systems, as well as organizational strategies and the nature of work, and currently the COVID-19 pandemic has led managers to rethink the way companies operate. The precautionary measures imposed by the COVID-19 pandemic, applied globally, have forced people to move away from headquarters to work remotely (Auray and Aurélien, 2020; Birinci et al., 2021; Pradyot et al., 2021; Hale et al., 2021). Later the changes continued by restricting the global flow of people, goods and services (Eggers, 2020; Brough et al., 2021; Phillipson et al., 2020). The unequal policies of suppressing socio-economic activities and the isolation measures taken by governments and economic agents to minimize socio-economic costs from 2019-2021 caused disproportionate negative effects among economies (Leite et al., 2020; Ivanov, 2020; Prentice et al., 2020; Mehrolia et al., 2021).

The business and management literature highlights the economic and social effects of the COVID-19 pandemic that have affected economies to a greater or lesser extent (Nayal et al., 2021; Donthu and Gustafsson, 2020; Verma and Gustafsson, 2020; George et al., 2020; Fairlie and Fossen, 2021).

However, it has been observed that certain enterprises called "creative enterprises" have managed the COVID-19 pandemic and its impact (He and Harris, 2020; Meyrick and Barnett, 2021). The dynamics of the impact has also been researched in the specialist literature and it has been observed that it varies significantly according to sectors, sub-sectors and countries (OECD, 2020; Dümcke, 2021).

In this study, an analysis of the evolution of economies over a period of 4 years, for 27 countries in Europe, was carried out through the following indicators: Gross Domestic Product, Gross Added Value, Final Consumption Expenditures and Net Export.

Material and method

The study included the period 2018-2021 for the following European countries: Belgium (BE), Bulgaria (BG), Czech Republic (CZ), Denmark (DK), Germany (DE), Estonia (EE), Ireland (IE), Greece (IL), Spain (ES), France (FR), Croatia (HR), Italy (IT), Cyprus (CY), Latvia (LV), Lithuania (LT), Luxembourg (LU), Hungary (HU), Malta (MT), Netherlands (NL), Austria (AT), Poland (PL), Portugal (PT), Romania (RO), Slovenia (SI), Slovakia (SK), Finland (FI), and Sweden (SE).

In this study, macroeconomic indicators were used for the analysis: gross domestic product at market prices, gross added value, final consumption expenditure, import of goods and services and export of goods and services. The statistical data were taken from the Eurostat database, which provides an overview of the economic situation of each country.

GDP at market prices is the final result of the production activity of resident productive units. This is an indicator that reflects the economic situation of a nation, obtained as the difference between the total value of all goods and services produced minus the value of goods and services used for intermediate consumption in their production.

Exports of goods and services consist of transactions of goods and services (sales, barter and gifts) from residents to non-residents. Imports of goods and services consist of transactions in goods and services (purchases, barter and gifts) from non-residents to residents. Imports and exports of goods occur when the economic ownership of goods changes between residents and non-residents.

To see the level reached by each country for each indicator, the average value of each indicator was calculated, according to formula (1).

$$Average = \frac{\sum_{i=1}^{27} c_i}{27} \quad (1)$$

Where: n - name of the indicator under study ($n = 1 \div 4$), c - indicator value for each country, i - name of the country under study ($i = 1 - 27$).

The statistical data were expressed in relative size by means of the share of each country in the total value at the level of each indicator, according to formula (2).

$$I_n = \frac{c_i}{\sum_{i=1}^{27} c_i} \quad (2)$$

The differences at the level of each indicator and country of the values related to the years 2021 and 2018 were calculated, according to formula (3).

$$Dif. = I_{n2021} - I_{n2018} \quad (3)$$

The net export value was calculated for 2018 and 2021, by subtracting the import value from the export value, according to formula (4).

$$Export\ net = Export - Import \quad (4)$$

Later, a comparative analysis of the countries was carried out based on the data obtained.

Results and discussions

Figure 1 shows the gross domestic product at market prices. From the analysis of Figure 1, it can be seen that the countries that recorded values above the average are only six: Germany, France, Italy, Spain, Holland and Poland, the other countries being with values below the average of 3.7%. It can also be observed that the year 2020 determined a decrease compared to the previous year in GDP in most countries (France, Italy, Spain, Belgium, Austria, Portugal, Czech Republic, Portugal, Greece, Hungary, Croatia), with the exception of Germany, the Netherlands, Poland, Sweden, Ireland, Denmark, Finland, Slovakia, Romania, Luxembourg, Bulgaria and Lithuania where decreases were recorded or Estonia,

Cyprus, Malta and Slovenia, where GDP remained at the same level. In 2021, it can be seen that the ranking remains at the level of the first six countries, most of them registering a slight decrease in GDP, with the exception of only France and Poland, which register an increase.

Figure 2 shows the gross added value indicator. At the level of this indicator, it can be observed that in 2020 the following countries are on the first places: Germany, France, Italy, Spain, Holland and Poland. In 2020, an increase of this indicator can be observed in Germany, the Netherlands and Poland, and a decrease in France, Italy and Spain. The year 2021 brings again a decrease in GDP in most countries except the Netherlands and Poland.

Figure 3 shows the evolution of the countries with regard to the "Expenditures with final consumption" indicator. From the analysis of Figure 3, it can be seen that the highest values are in countries such as Germany, France, Italy, Spain and Belgium. The values of this indicator vary in 2020 and 2021 as a result of the effects of the pandemic, there are countries that recorded decreases in certain years: Germany (increase in 2020 by 0.44% and decrease in 2021 by 0.5%), France (increase in 2020 0.07% and maintaining in 2021), Italy (decrease in 2020 by 0.56% and in 2021 by 0.09%), Spain (decrease in 2020 by 0.41% and in 2021 by 0.01%) and countries that registered increases: the Netherlands (in 2020 by 0.09% and in 2021 with 0.07%), Poland (in 2020 with 0.09% and in 2021 with 0.07%). Below average values are registered in countries such as: Sweden, Belgium, Austria, Denmark, Romania, Finland, Portugal, Greece, Czech Republic, Bulgaria, Ireland, Hungary, Slovakia, Croatia, Lithuania, Slovenia, Luxembourg, Latvia, Estonia, Cyprus and Malta.

Table 1 presents the comparative situation of the differences recorded in 2021 compared to 2018 for the three indicators: gross domestic product (GDP), gross value added (GVA) and final consumption expenditure (FCE). From the analysis of Table 1, it can be seen that the biggest negative differences in the indicators: Gross Domestic Product, Gross Added Value and Final Consumption Expenditures were recorded in the countries: Italy, Spain and France. Positive differences in the growth of Gross Domestic Product, Gross Value Added and Final Consumption Expenditure were recorded in Ireland, Poland and Sweden, which show us an improvement in the economic situation in these countries.

Figure 4 shows the evolution of the countries through the indicator 'Imports of goods and services' Above-average values of imports of goods and services are found in the following countries: Germany, France, Holland, Italy, Spain, Belgium, Ireland and Poland. Values below the average are recorded in the other countries. The biggest variations of this indicator are recorded in France (in 2020 compared to 2019 a decrease of 0.54% and of 0.2% in 2021), Spain (in 2020 compared to 2019 a decrease of 0.52% and an increase in 2021 compared to 2020 of 0.27%), Ireland (in 2020 compared to 2019 an increase of 0.51% and in 2021 compared to 2020 a decrease of 1.42%), Poland (in 2020 compared to 2019 an increase of 0.29% and in 2021 compared to 2020 an increase of 0.28%) and the Netherlands (in 2020 compared to 2019 an increase of 0.24% and in 2021 compared to 2020 a decrease of 0.23%).

Figure 5 shows the evolution of the countries for the 'Exports of goods and services' indicator. From the analysis of figure 5, it can be seen that the largest volume of exports, respectively values above the average, are obtained by the following countries: Germany, France, Holland, Italy, Ireland, Spain and Poland. The biggest variations in the export level are found in the following countries: Ireland (in 2020 compared to 2019 an increase of 1.36% and in 2021 compared to 2020 a decrease of 0.13%), France (in 2020 compared to 2019 a decrease of 0.99% and in 2021 compared to 2020 a decrease of 0.09%), Spain (in 2020 compared to 2019 a decrease of 0.79% and in 2021 compared to 2020 an increase of 0.25%), Poland (in 2020 compared to 2019 an increase of 0.43% and in 2021 compared to 2020 an increase of 0.06%) and Italy (in 2020 compared to 2019 a decrease of 0.38% and in 2021 compared to 2020 an increase of 0.11%).

Table 2 shows the net export situation taking into account the export and import values of the countries at the level of 2021.

From the analysis of Table 2, it can be seen that there are only 6 countries that recorded a trade surplus in 2021: Ireland, Germany, the Netherlands, Denmark, Sweden and Malta compared to 2018 when there was also Bulgaria and France, and the rest of the countries recorded a deficit. It can also be observed that compared to 2018 there are countries that recorded an increase in net export: Ireland, the Netherlands and Luxembourg.

Discussion and conclusions

The analysis of the macroeconomic indicators presented in this study shows us the situation of the countries' evolution before and after the COVID-19 pandemic, and the way in which these indicators underwent changes determines us to understand the result of the policies applied by managers and governments to face the situation created. From the analysis, it can be seen that the effects are multiple both at the level of the indicators: "Gross domestic product", "Gross value added" and "Expenditure with final consumption" as well as at the level of the Net Export indicator.

The obtained results allow us to say that there are countries that have recorded positive growth results in Gross Domestic Product, Gross Added Value and Final Consumption Expenditure, as a result of the activities carried out by economic agents (Ireland, Poland, Sweden and the Netherlands), but there are also countries where the results are decreasing (Italy, Spain and France). At the level of those countries where the results are negative at the GDP level, we can talk about a decrease in production or a stagnation that shows a worsening of the economic situation, this being also correlated with the "Gross added value" indicator. At the "Final consumption expenditure" indicator, we observe the combined effect given by the increase in the prices of raw materials and materials and the decrease in production, which determines the value of this indicator to have significant changes among the economies.

The impact created by the COVID-19 pandemic can be seen through the effects generated among the 'Net Export' indicator where we have more significant positive values increasing only in Ireland, the Netherlands and Luxembourg and also negative values in France, Belgium, Romania and Greece. The existence of a positive net export determines a trade surplus and thus an increase in the net flow of internal currency inflows from foreign markets and the control over the own currency through trade, and finally the consolidation of the own currency. Contrary to the trade surplus, the trade deficit registered by countries with negative values at the level of net export shows us a net outflow of national currency to foreign markets.

Notes

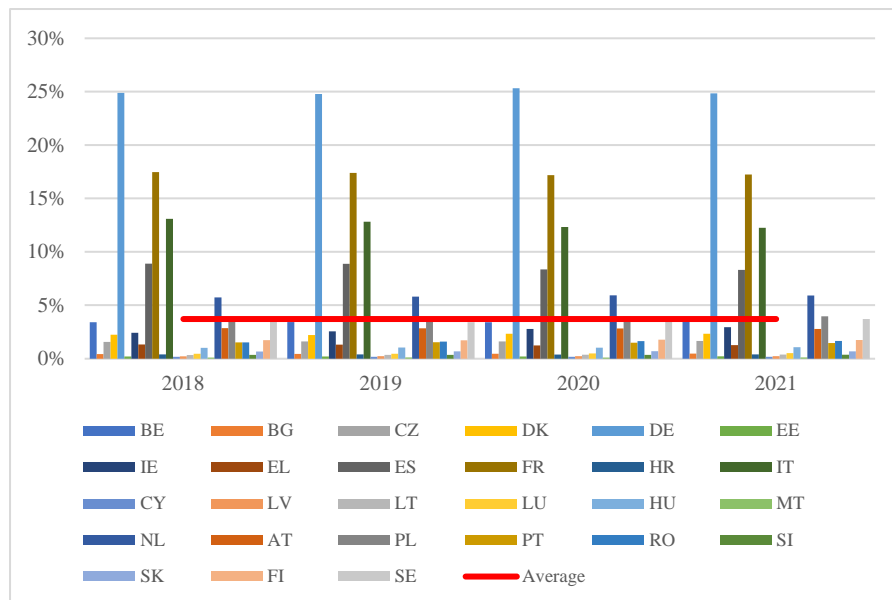


Figure 1. GDP current prices

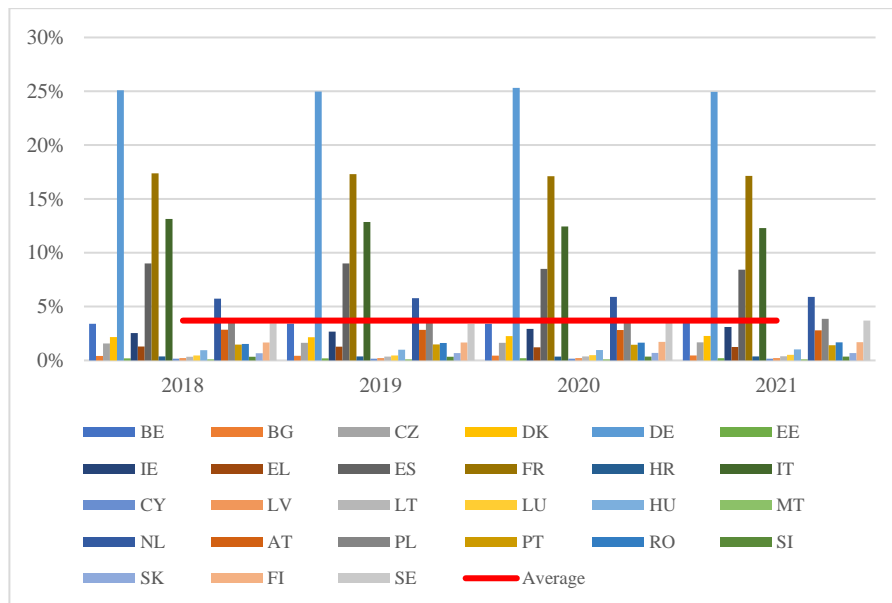


Figure 2. Value added, gross

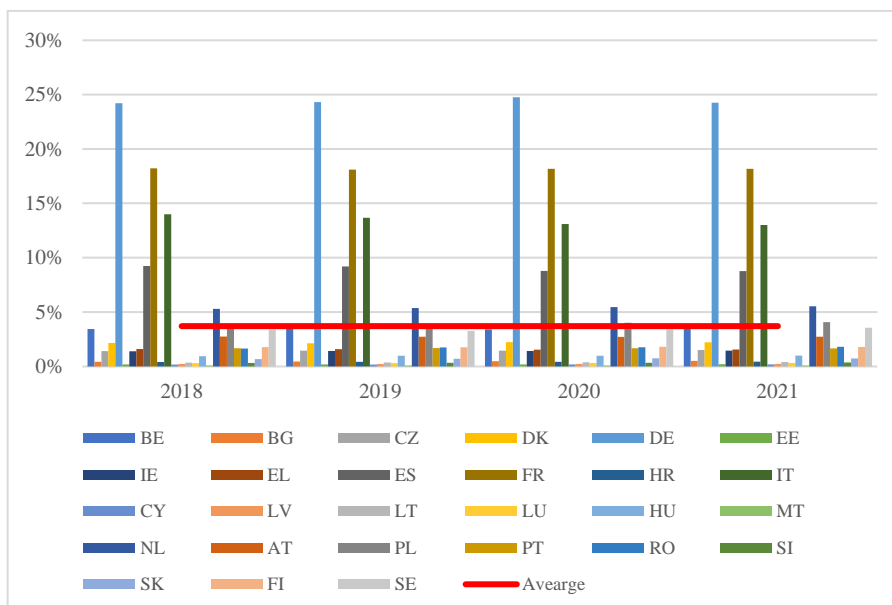


Figure 3. Final consumption expenditure

Table 1. Comparative situation of GDP

Country	Gross domestic product			Gross added value			Final consumption expenditure		
	2018	2021	Dif.	2018	2021	Dif.	2018	2021	Dif.
BE	3,40%	3,49%	0,09%	3,39%	3,49%	0,10%	3,44%	3,47%	0,02%
BG	0,42%	0,47%	0,05%	0,40%	0,46%	0,05%	0,43%	0,51%	0,08%
CZ	1,56%	1,64%	0,08%	1,57%	1,67%	0,10%	1,41%	1,50%	0,10%
DK	2,23%	2,32%	0,09%	2,17%	2,26%	0,09%	2,15%	2,22%	0,07%
DE	24,87%	24,83%	-0,05%	25,10%	24,94%	-0,15%	24,20%	24,25%	0,05%
EE	0,19%	0,21%	0,02%	0,19%	0,21%	0,02%	0,18%	0,20%	0,02%
IE	2,41%	2,94%	0,52%	2,53%	3,10%	0,57%	1,39%	1,45%	0,05%
EL	1,33%	1,26%	-0,07%	1,29%	1,23%	-0,05%	1,60%	1,56%	-0,04%
ES	8,89%	8,31%	-0,59%	9,00%	8,42%	-0,58%	9,23%	8,77%	-0,47%
FR	17,47%	17,24%	-0,23%	17,38%	17,14%	-0,24%	18,22%	18,17%	-0,04%
HR	0,39%	0,39%	0,00%	0,36%	0,37%	0,01%	0,41%	0,44%	0,03%

IT	13,09%	12,24%	-0,85%	13,14%	12,30%	-0,85%	13,99%	13,01%	-0,98%
CY	0,16%	0,16%	0,00%	0,16%	0,16%	0,00%	0,17%	0,18%	0,01%
LV	0,22%	0,23%	0,01%	0,21%	0,22%	0,01%	0,23%	0,23%	0,01%
LT	0,34%	0,38%	0,05%	0,34%	0,38%	0,04%	0,35%	0,40%	0,05%
LU	0,45%	0,51%	0,06%	0,45%	0,52%	0,06%	0,30%	0,32%	0,02%
HU	1,01%	1,06%	0,06%	0,95%	1,01%	0,06%	0,94%	1,00%	0,06%
MT	0,10%	0,10%	0,01%	0,09%	0,10%	0,01%	0,08%	0,09%	0,01%
NL	5,72%	5,90%	0,18%	5,73%	5,89%	0,17%	5,30%	5,52%	0,23%
AT	2,85%	2,78%	-0,07%	2,85%	2,78%	-0,07%	2,74%	2,73%	-0,01%
PL	3,68%	3,96%	0,28%	3,60%	3,86%	0,26%	3,79%	4,08%	0,29%
PT	1,52%	1,46%	-0,06%	1,47%	1,41%	-0,06%	1,67%	1,66%	0,00%
RO	1,51%	1,66%	0,14%	1,53%	1,68%	0,15%	1,65%	1,81%	0,16%
SI	0,34%	0,36%	0,02%	0,33%	0,35%	0,02%	0,32%	0,36%	0,03%
SK	0,66%	0,67%	0,01%	0,66%	0,67%	0,01%	0,67%	0,73%	0,06%
FI	1,73%	1,73%	0,01%	1,66%	1,69%	0,02%	1,77%	1,79%	0,02%
SE	3,48%	3,71%	0,23%	3,45%	3,69%	0,24%	3,37%	3,55%	0,18%

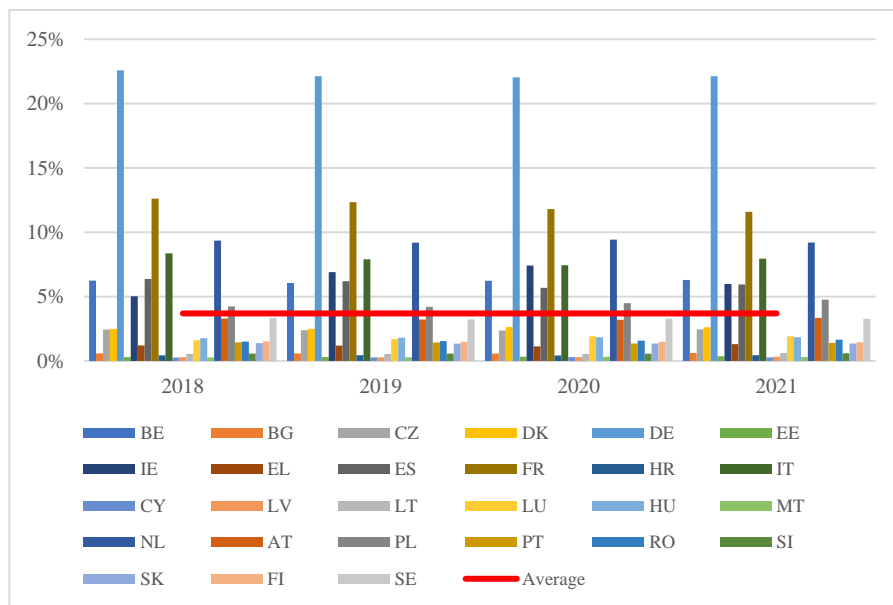


Figure 4. Goods and services, imports

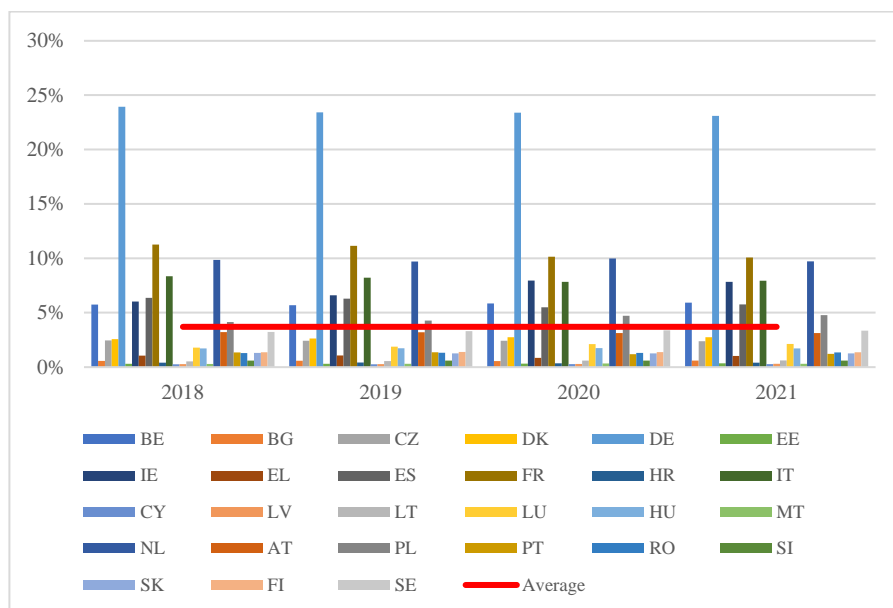


Figure 5. Goods and services, exports

Table 2. Comparative situation of net export

Country	Export		Import		Net Export		Country	Export		Import		Net Export	
	2018	2021	2018	2021	2018	2021		2018	2021	2018	2021	2018	2021
BE	5,74%	5,91%	6,25%	6,29%	-0,51%	-0,38%	LT	0,51%	0,61%	0,54%	0,62%	-0,03%	-0,01%
BG	0,55%	0,58%	0,58%	0,62%	-0,02%	-0,04%	LU	1,78%	2,12%	1,61%	1,91%	0,17%	0,21%
CZ	2,44%	2,37%	2,44%	2,45%	0,00%	-0,09%	HU	1,71%	1,71%	1,76%	1,83%	-0,05%	-0,12%
DK	2,57%	2,74%	2,48%	2,61%	0,08%	0,13%	MT	0,28%	0,30%	0,27%	0,29%	0,01%	0,01%
DE	23,93%	23,09%	22,58%	22,13%	1,34%	0,97%	NL	9,84%	9,71%	9,36%	9,20%	0,49%	0,51%
EE	0,29%	0,34%	0,30%	0,36%	-0,01%	-0,03%	AT	3,21%	3,12%	3,30%	3,34%	-0,09%	-0,23%
IE	6,02%	7,83%	5,02%	5,98%	1,00%	1,84%	PL	4,13%	4,77%	4,23%	4,77%	-0,10%	0,00%
EL	1,05%	1,01%	1,20%	1,31%	-0,15%	-0,30%	PT	1,34%	1,21%	1,44%	1,41%	-0,10%	-0,19%
ES	6,35%	5,75%	6,36%	5,95%	-0,01%	-0,20%	RO	1,29%	1,34%	1,51%	1,65%	-0,22%	-0,31%
FR	11,26%	10,06%	12,61%	11,59%	-1,35%	-1,53%	SI	0,58%	0,59%	0,57%	0,60%	0,01%	-0,01%
HR	0,39%	0,40%	0,43%	0,44%	-0,04%	-0,04%	SK	1,29%	1,25%	1,38%	1,36%	-0,08%	-0,11%
IT	8,34%	7,94%	8,36%	7,95%	-0,02%	-0,01%	FI	1,35%	1,35%	1,51%	1,45%	-0,16%	-0,10%
CY	0,24%	0,26%	0,26%	0,28%	-0,02%	-0,02%	SE	3,23%	3,34%	3,33%	3,27%	-0,10%	0,07%
LV	0,27%	0,29%	0,30%	0,32%	-0,03%	-0,03%							

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THE IMPACT OF THE COVID-19 PANDEMIC ON BUSINESSES IN EUROPEAN COUNTRIES

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Abstract

Purpose – This study aimed to determine the impact of the COVID-19 pandemic on the number of businesses and the turnover generated by them.

Methodology/approach - In order to carry out the study, the existing data were processed and following the processing, relative values of the indicators were obtained: number of enterprises, turnover and average turnover per enterprise, which were later compared with the year 2018, considered the reference year.

Findings – Following the analysis, it was found that there are both increases and decreases in the mentioned indicators, and the size of the turnover is not always directly influenced by the number of companies.

Research limitations/implications – The limitations were given by the existence of different economic conditions both before and during the pandemic at the country level which contributed to the changes that occurred and which cannot be measured and respectively quantified with certainty.

Practical implications – The study allowed obtaining a result recorded by the companies in industry and construction, and the results can be used in further research.

Originality/value – The study carried out provides information on the evolution of the countries during this period as a result of the comparative analysis between the years studied.

Key words: Turnover, comparative analysis, pandemic reality.

Introduction

The COVID-19 pandemic has determined an unprecedented situation for organizations and people, with economies still under the impact of this shock. The effects of the pandemic are compared by some specialists to the Great Depression of 1929, the Second World War and the Great Recession of 2008–2009 (Roper and Turner, 2020; Azzopardi et al., 2022; Rose, 2021; Eichengreen et al., 2021). The problem of the return and recovery of enterprises through production is intensively discussed in the specialized literature, and from the existing studies it is observed that in some sectors of activity the introduction of technology and digitization related to industry 4.0. yielded results (Büchi et al., 2020, Ivanov and Dolgui, 2020; Fragapane et al., 2020). Other specialists consider that the new post-pandemic context has determined managers to accept changes and reorganizations of activities and businesses (Rapaccini et al., 2020; Klein and Todesco, 2021). For the recovery and the exit from the pandemic, many specialists have focused on two recovery models: increasing production capacity and increasing the supply of raw materials, both of which are intended to contribute to the increase in turnover (El Baz and Ruel, 2021; Ivanov and Dolgui, 2020; Nagurney, 2021; Paul and Chowdhury, 2021).

Other researchers (Morais and Ferreira, 2020) mention the role of SMEs as the ‘backbone of economies’ and discuss the need for their support by governments by granting financing (Brem et al., 2021). Thus, the major problem of SMEs is emphasized, given the capacity and resources to face uncertainties, as well as the vulnerability to risks, which produces much faster the lack of capital and therefore the need for financial support (Goodell, 2020).

The study consisted of a comparative analysis of the statistical data related to the number of companies and the turnover obtained in 27 European countries. He compared the year 2018 with the years 2019

and 2020, years of the COVID-19 pandemic, aiming to find out if the imposed restrictions had an effect on the existing economies in these European countries.

Material and method

The study included the period 2018-2020 for the following European countries: Belgium (BE), Bulgaria (BG), Czech Republic (CZ), Denmark (DK), Germany (DE), Estonia (EE), Ireland (IE), Greece (EL), Spain (ES), France (FR), Croatia (HR), Italy (IT), Cyprus (CY), Latvia (LV), Lithuania (LT), Luxembourg (LU), Hungary (HU), Malta (MT), Netherlands (NL), Austria (AT), Poland (PL), Portugal (PT), Romania (RO), Slovenia (SI), Slovakia (SK), Finland (FI), and Sweden (SE).

The main macroeconomic indicators studied are: (1) the number of companies in industry and construction, (2) the turnover obtained by companies in industry and construction and (3) the turnover relative to the number of companies in industry and construction. In this study, the statistical data existing in the Eurostat database, which provides an overview of the economic situation of each country, was used for the analysis of macroeconomic indicators.

The statistical data were expressed in percentages by calculating the weight of each country in the total value at the level of each indicator, according to formula (1).

$$I_n = \frac{c_i}{\sum_{i=1}^{27} c_i} \quad (1)$$

Where: n - name of the indicator under study ($n = 1 \div 3$), c - indicator value for each country, i - name of the country under study ($i = 1 - 27$).

Indices based on the chain were calculated for the years 2019 and 2020 using the year 2018 as the reference year, according to the formulas (2-3).

$$i_{2019/2018} = \frac{c_{i2019}}{c_{i2018}} \quad (2)$$

$$i_{2020/2018} = \frac{c_{i2020}}{c_{i2018}} \quad (3)$$

Finally, the average turnover in industry and construction was calculated as a ratio between the turnover and the number of enterprises in each country, according to formula (4).

$$\overline{CA}_i = \frac{CA_i}{NE_i} \quad (4)$$

Where: \overline{CA}_i – average turnover, CA_i – turnover from country i , NE_i – number of companies from country i .

Then the share of the average turnover related to each country was determined as a ratio between the average turnover and the total average turnover from the countries under study, in order to analyze the size of each country, according to formula (5).

$$\%CA = \frac{\overline{CA}_i}{\sum_{i=1}^{27} \overline{CA}_i} \quad (5)$$

Finally, a comparative analysis was made between the years studied.

Results and discussion

Figure 1 shows the situation of the countries according to the number of companies in the industry. From the analysis of Figure 1, it can be seen that most companies in the industry are found in Poland, followed by Spain, Italy and Germany. It can also be observed that in 2020, compared to 2018, in some countries the situation worsened: Bulgaria, Greece, Spain, France, Croatia, Hungary, Austria, Poland, Slovenia, Slovakia, Finland and Sweden, leading to a decrease in the number of enterprises and in other countries the situation has improved: Belgium, the Czech Republic, Denmark, Germany, Estonia, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Portugal and Romania.

In Figure 2, you can see the situation of the countries according to the number of companies in the construction field. Analyzing Figure 2, it can be seen that most companies active in the field of construction are in countries such as: Italy, France, Poland, Germany and Spain.

In order to better see the dynamics of the countries in the period 2018-2020, Table 1 was built. From the analysis of Table 1, it can be seen that the existing economic situation and the COVID-19 pandemic

caused changes by decreasing the number of industrial enterprises in 8 countries in 2019 and in 12 countries in 2020. Also in the field of construction, the negative effect can be observed in 2019 in a number of 15 countries and in 2020 in a number of 16 countries. From the analysis of Table 1, it can be seen that in 2019 in the industry, the biggest decrease is 13.63% in Malta (86.37%), and then 10.04% in Croatia (89.96%). Decreases below 10% were recorded in Spain, below 5% in France, Bulgaria, and below 2% in Greece, Romania and Poland. In 2020, the effect of the COVID-19 pandemic continued to produce a decrease in the number of companies in the industry, which is still observed in Croatia (84.25%), and in Malta the situation is changing, registering an increase. Decreases below 10% were recorded in France (90.58%), Spain (94.53%), Greece (94.99%), Slovenia (94.62%), and below 5% in Poland (96.61%), Austria (97.21%), Finland (97.64%), Bulgaria (99.09%), Sweden (99.2%), Cyprus (99.58%).

In the field of construction in 2019, the negative effect of the COVID-19 pandemic was much greater, causing a decrease in the number of companies compared to 2018 in a number of 19 countries, unlike the situation in industry where the number was 12 countries. Thus in construction we see the biggest decrease in 2019 compared to 2018 of approximately 6.56% in Italy (93.44%), followed by Malta (94.54%), and below 5% in Latvia, Spain, Sweden, Finland, Lithuania, Czech Republic, Italy, Austria, Denmark, Greece, Bulgaria, Slovenia and France. It can also be observed that the COVID-19 pandemic caused a decrease in the number of businesses in 2020 compared to 2018, in most countries, the largest decrease being in Italy (91.02%). The exception is 11 countries that register an increase in the number of enterprises in 2020 compared to 2018: Cyprus, Germany, Portugal, Estonia, the Netherlands, Malta, Romania, Belgium, Poland, Hungary and Croatia.

Figure 3 shows the evolution of the countries according to the turnover recorded by the companies in the industry. From the analysis of Figure 3, it can be seen that in 2020 the highest turnover is recorded in countries such as: Holland, Poland, Germany and Italy.

Figure 4 shows the evolution of the countries according to the turnover recorded by the construction companies. It can be observed that in the field of construction, the highest turnover of companies is found in countries such as: Germany, France, Italy and the Netherlands.

To analyze the dynamics of the turnover, Table 2 was built, which gives us the opportunity to follow the evolution of the turnover in the countries studied compared to the field of activity. From the analysis of Table 2, it can be seen that the turnover in 2019 compared to 2018, in industry decreased in 3 countries: Germany, Croatia and the Netherlands, and in construction in 11 countries: Sweden, Italy, Latvia, Greece, Denmark, Finland, Austria, Slovakia, Slovenia, Czech Republic and Luxembourg. In 2020, compared to 2018, the situation worsened, so that in industry the number of countries in which the turnover fell below the value of 2018 increased from 3 to 7 countries and in construction from 11 to 15 countries. The biggest increase in turnover in 2020 compared to 2018 was recorded in industry in: Romania, Bulgaria, Malta and Sweden and in construction in: Bulgaria, Romania and Germany. For a total of 27 countries studied, the value of turnover decreased in 2020 compared to 2018 by 26% (to 74.04%) in industry, and in construction it increased by 7% (to 107.28%).

In Figure 5, an analysis of the share of turnover in the industry was carried out. Depending on the share of turnover in the industry, the countries can be grouped as follows: between 10-30% we have: Holland and Denmark (with the highest values), between 5-10% we have the Czech Republic, Luxembourg, Sweden, Austria and Germany (with average values), and under 5% we have in: Romania, Bulgaria, Poland, France, Italy, Belgium, Ireland, Slovenia, Finland, Estonia, Spain, Lithuania, Slovakia, Hungary, Cyprus, Greece, Croatia, Portugal, Latvia, Malta (with lower values).

From the analysis of Figure 5 and Tables 1 and 2, it can be seen that there is no direct connection between the number of enterprises and the turnover. Thus, the biggest discrepancy between the large turnover and the number of smaller enterprises is found in the Netherlands and Germany. In countries such as Spain, Poland, Greece and Finland, the share of the number of enterprises is high and the share of turnover is small. Contrary to this situation we see in the Netherlands, Germany, the Czech Republic, Romania, Austria, Slovenia and Denmark.

Figure 6 shows the field of construction, where the highest level of turnover share is found in Germany, which ranks first, followed by France, Italy, Spain, Holland, Portugal, Slovenia and Belgium.

Depending on the share of the turnover per company in the industry, the countries can be grouped as follows: between 10-15% we have Luxembourg and Austria (with the highest values), between 5-10%

we have in Denmark, Germany, Finland and Sweden (with middle values), and below 5% we have: Belgium, France, Holland, Bulgaria, Ireland, Estonia, Cyprus, Romania, Latvia, Spain, Croatia, Italy, Slovakia, Malta, Portugal, Poland, Hungary, Lithuania, Czech Republic, Greece and Slovakia (with lower values).

From the analysis of Figure 6 and Tables 1 and 2, we see that also in the field of construction we find countries where the share of turnover is high and that of the number of enterprises is small (Germany, France, Slovenia, Holland and Belgium) and vice versa (Italy, Poland, Spain, Czech Republic, Slovakia, Hungary and Portugal).

Discussion and conclusions

In the study carried out, an analysis of the evolution of the number of enterprises and the turnover in the period 2018-2020 was obtained, capturing the situation before the COVID-19 pandemic (year 2018) and the subsequent one (2019 and 2020). Although the effects of the pandemic are quite complicated and complex, the study allowed the global identification of the effect in the economy propagated on the one hand by the reluctant attitude of investors to invest or to keep their businesses and on the other hand by the domino effect generated by the restrictions imposed and the total or partial cessation of the activity.

Through the study, it can be observed that at the level of the number of companies active in the industry, a higher percentage decrease is observed compared to the number of companies in the field of construction. This decrease can also be interpreted as a result of the specifics of the activity, knowing that in industry work is generally done in closed spaces and in construction the activities are predominantly in open spaces.

From the analysis of turnover, we can see that it also suffered a decrease both in industry and in construction. This decrease was generated by the delays in the supply and supply chain (due to health restrictions where physical presence was mandatory), the delays generated by the volume of production and consumption (reluctant and uncertain attitude both among investors and among consumers) or the effect of the disturbances generated by the interconnection of economies worldwide.

Although only 2020 is considered the first pandemic year, the research could not be extended to the following years as a result of the lack of statistical data, but this will represent a future research effort.

Notes

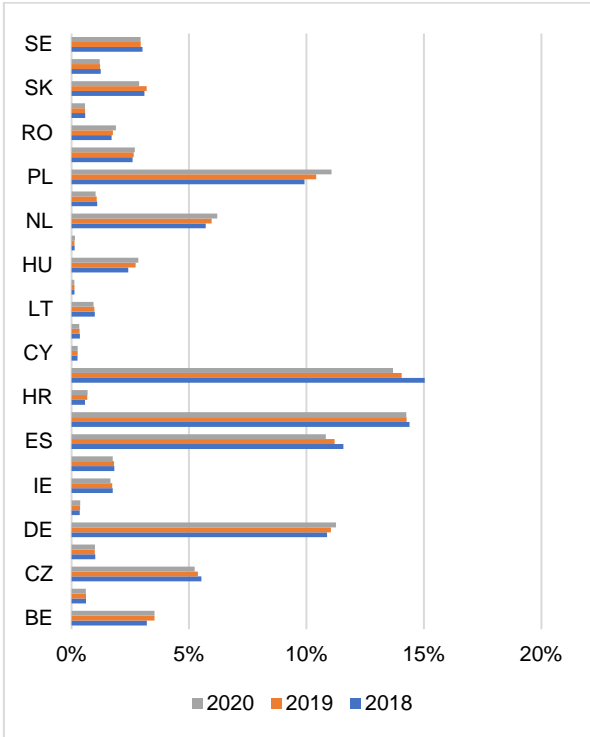
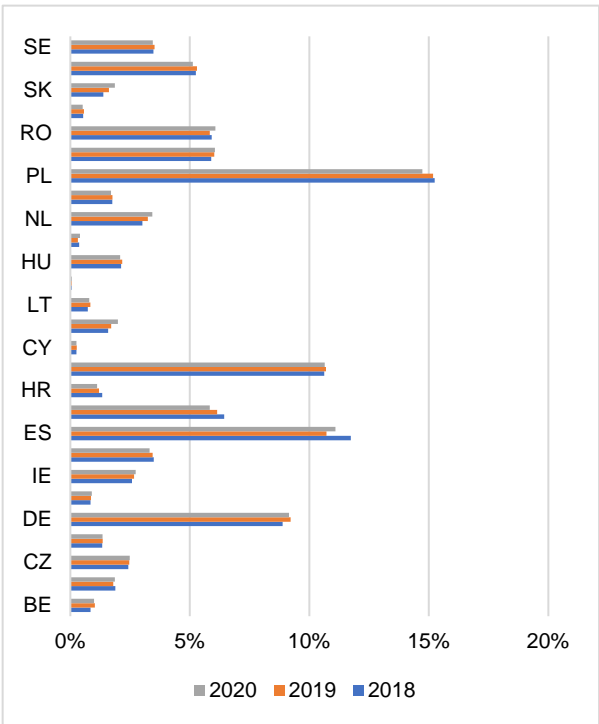


Figure 1. The number of companies in the industry Figure 2. The number of companies in the construction

Table 1. The situation of the evolution of the number of enterprises

Year	Industry		Construction		Year	Industry		Construction	
	2019/2018	2020/2018	2019/2018	2020/2018		2019/2018	2020/2018	2019/2018	2020/2018
BE	121.17%	117.15%	110.20%	110.26%	LT	114.46%	108.32%	97.67%	94.85%
BG	95.46%	99.09%	99.38%	99.03%	LU	102.37%	113.22%	101.52%	97.55%
CZ	101.40%	102.38%	97.24%	94.80%	HU	102.37%	98.30%	113.08%	117.79%
DK	101.48%	101.02%	98.01%	98.39%	MT	86.37%	108.27%	94.54%	109.70%
DE	103.76%	102.96%	101.49%	103.52%	NL	107.46%	113.59%	104.34%	108.57%
EE	103.07%	106.78%	103.34%	104.66%	AT	100.35%	97.21%	98.43%	93.66%
IE	103.28%	106.00%	98.77%	94.71%	PL	99.58%	96.61%	105.02%	111.58%
EL	98.65%	94.99%	99.31%	96.40%	PT	102.17%	102.60%	101.96%	103.65%
ES	91.35%	94.53%	96.74%	93.49%	RO	98.67%	102.59%	103.24%	110.94%
FR	95.40%	90.58%	99.13%	99.02%	SI	106.77%	96.42%	99.02%	99.74%
HR	89.96%	84.25%	117.31%	119.66%	SK	117.36%	135.15%	103.12%	92.77%
IT	100.65%	100.18%	93.44%	91.02%	FI	100.91%	97.64%	97.59%	96.54%
CY	104.69%	99.58%	102.33%	102.99%	SE	101.35%	99.20%	97.49%	97.39%
LV	107.97%	126.07%	96.38%	92.74%					

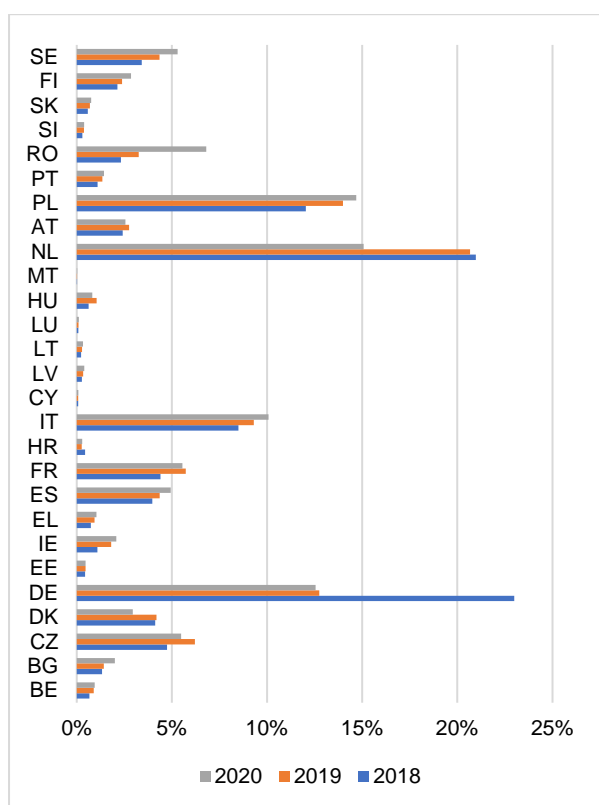


Figure 3. Turnover or gross premiums written in industry

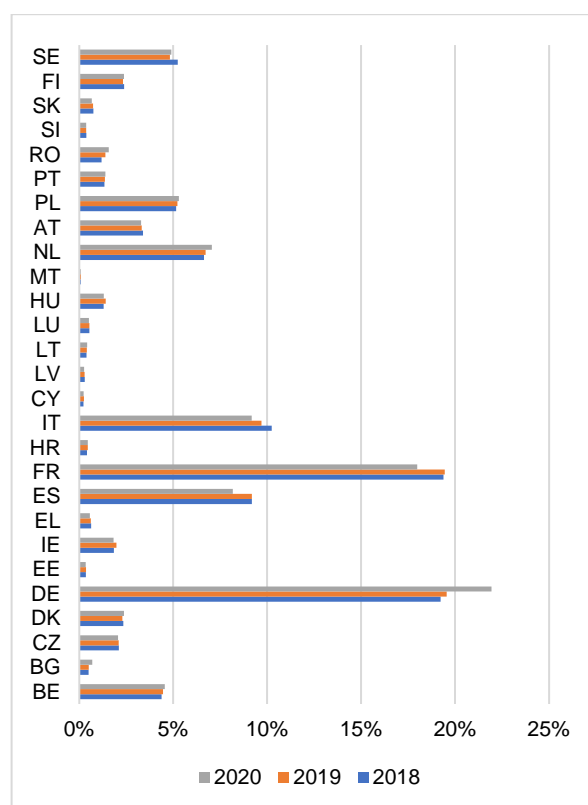


Figure 4. Turnover or gross premiums written in construction

Table 2. The situation of turnover evolution

Year	Industry		Construction		Year	Industry		Construction	
	2019/2018	2020/2018	2019/2018	2020/2018		2019/2018	2020/2018	2019/2018	2020/2018
BE	133.71%	105.63%	101.83%	102.14%	LT	121.89%	118.73%	103.04%	104.03%
BG	107.18%	140.30%	102.53%	136.35%	LU	113.86%	117.95%	99.13%	96.44%
CZ	130.97%	88.31%	99.31%	98.49%	HU	169.00%	78.29%	108.77%	92.71%
DK	101.49%	70.41%	97.74%	103.81%	MT	108.76%	138.72%	110.95%	98.30%
DE	55.44%	98.48%	101.72%	112.17%	NL	98.57%	72.91%	101.32%	104.97%
EE	105.65%	101.00%	102.08%	95.06%	AT	114.08%	92.88%	97.78%	99.20%
IE	166.85%	114.50%	107.04%	92.61%	PL	116.22%	105.02%	101.32%	101.42%
EL	126.06%	111.30%	97.09%	91.30%	PT	122.98%	106.71%	101.52%	102.43%
ES	109.68%	113.26%	100.01%	88.92%	RO	140.27%	208.82%	116.63%	113.17%
FR	130.28%	96.91%	100.37%	92.44%	SI	126.09%	103.46%	97.98%	101.27%
HR	59.27%	111.26%	109.96%	99.91%	SK	117.74%	110.12%	97.93%	91.27%
IT	109.50%	108.25%	94.73%	94.58%	FI	111.56%	119.82%	97.53%	102.23%
CY	104.22%	104.47%	112.23%	93.75%	SE	127.50%	121.82%	92.13%	101.48%
LV	124.31%	118.25%	96.05%	92.40%					

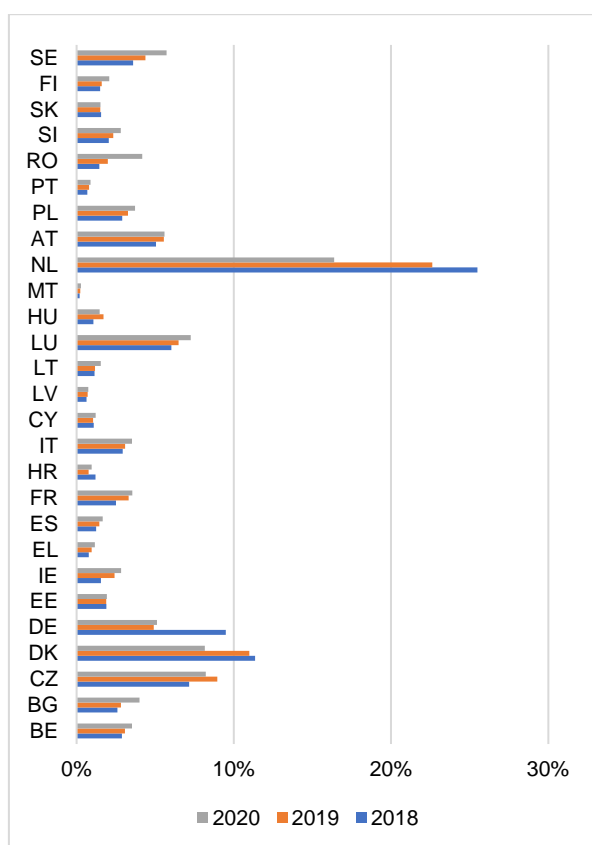


Figure 5. The turnover situation related to the number of companies in the industry in 2020

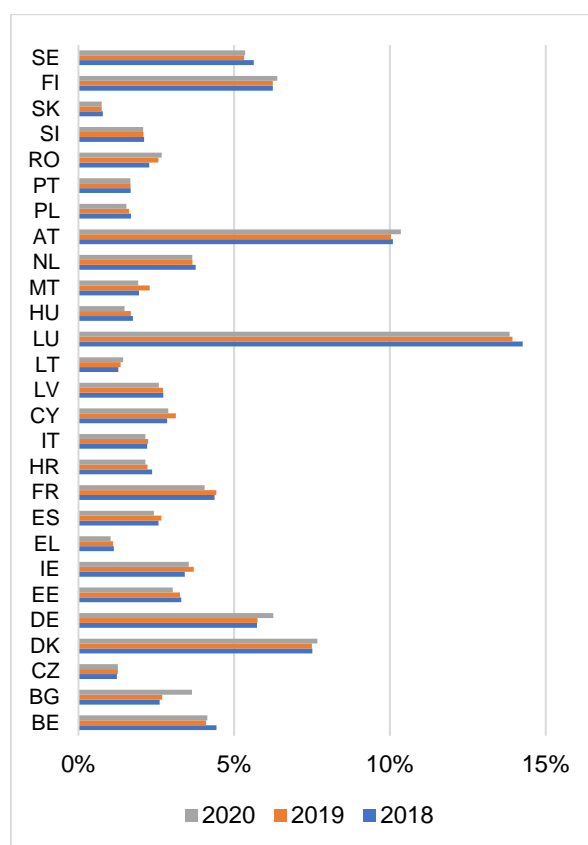


Figure 6. The turnover situation related to the number of construction companies in 2020

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AN EFFICIENT BUSINESS MODEL FOR AN ON-LINE MENTORING PLATFORM WITH ACTIVE INVOLVEMENT OF SENIORS IN THE CONTEXT OF THE POST-PANDEMIC REALITY

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Abstract

Purpose – Define an efficient business model for an on-line knowledge transfer platform between senior mentors and companies.

Methodology/approach – User needs analysis, market survey analysis, market demand, lean canvas and business model

Findings – the specific needs of each type of user must be fulfilled; for commercial success such a platform needs a unique selling point.

Research implications – co-creation workshops, mentors and companies surveys, user-based platform design, AI-based matchmaking tool.

Practical implications – the on-line platform sets up an environment where project based/specific information is transferred through individual meetings from senior experts towards young developing companies.

Originality/value – the on-line platform addressed the specific needs of engineering companies using an intelligent matchmaking tool to ensure that the best possible mentor is provided for a developing company.

Key words: on-line mentoring platform, intelligent matchmaking tool, business model.

Introduction

The current e-learning platforms – some of the most known are [udemy.com](https://www.udemy.com/), [linkedin.com](https://www.linkedin.com/), [coursera.org](https://www.coursera.org/) – offer self-learning standard content. The content is generally of a high quality, but it is not specific and customized, the interaction with the instructor is low, from here the lack of motivation of the student. This leads to a high abandonment rate. The fees for such training are relatively low and the service model is based on a high volume of sales for the same content. To be able to offer the same content to a large number of users, the content ends up being at a basic level. This represents a limitation for the users that would like to become experts in certain areas. In this way, the typical outcome for the end user is a certificate and not real knowledge or expert advice [Araka, et al 2020]. The e-learning platforms on the market have addressed in particular children, young and active people. From our research so far, there are no digital platforms whose main objective is the social involvement of senior people and which offers them the opportunity to become mentors, to give them the chance to transfer their knowledge to younger generations. [Gherman, et al 2021].

While the use of digital technologies increased in the last decade, they became, in many cases essential tools for many businesses in the context of the COVID-19 pandemic [Meyer et al. 2022]. Multiple businesses adopted on-line technologies mainly for communication purposes, and knowledge transfer platforms are one of the best practices in this regard.

The paper presents the development strategy and business model of an online platform for knowledge exchange developed in the framework of Ambient Assisted Living of the European Union, within an international partnership. The paper describes the Target groups and market, the go to market strategy, an overview of the WisdomOfAge platform, the Lean Canvas and Business model, developed to achieve successful commercial implementation.

Target Group & Market

The main target Group of the WisdomofAge platform will be made up of Industrial companies (Startups, SME) looking for a mentor to support the learning process of their employees. These companies will be mainly from European Union countries (platform will be developed in English, German, Romanian and French). The need for mentoring is high (figure 1) and the market is expected to grow by 20% per year in the next 5 years [Pisla et al, 2021]. WisdomofAge will focus on industrial companies, especially the Smart Manufacturing Sector.

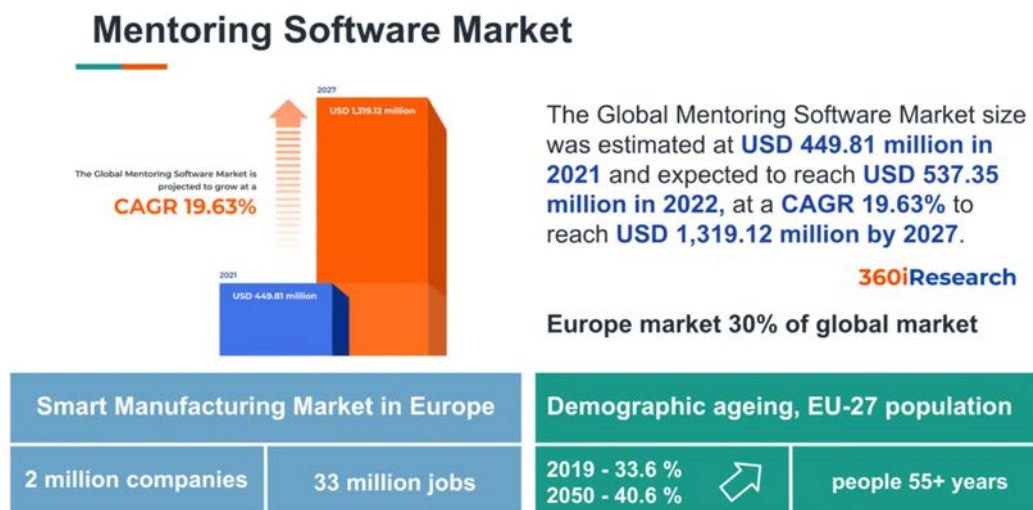


Fig.1 - Analysis of the mentoring software market

Market Segmentation

The market will be made up of people and organizations that want to learn online and specialize with a mentor-based learning system. The market can be segmented in:

- Industrial companies (Startups, SME) looking for a mentor to support the learning process of their employees, and faster development of the company on specific fields/applications.
- Employees who want to specialize in other fields to advance in their career.
- Research organizations that need specific skills in related fields of activity.
- Young people aiming to improve their knowledge acquired in high schools or universities.
- Master and doctoral students who need practical experience in completing research.
- Start-up companies that need expertise in a certain field and need a mentor.
- Associations that want to support members through continuous training programs.

Go To Market Strategy

Digital Twin, as business partners, is responsible for Go to Market Strategies (figure 2). The company has a relevant experience in the market. It began as a start-up in 2016 and managed to grow the business to over 1 Million Euro in only 3 years by using effective marketing and sales strategies. The

company has strong marketing knowledge and a very good understanding of the need for industrial digital transformation. In 2019 the company was awarded by Siemens Digital Industries Software - Top Business Partner in Central Eastern Europe. Digital Twin has invested in the last 4 years in e-learning and has good experience in working online with instructors and students. Partnerships with professional associations represent an important aspect of the business plan; these agreements will (1) improve the awareness of the platform, (2) promote the benefits, and (3) attract early adopters. Also using these partnerships, will help us to get more feedback from the market and continuously optimize the business plan. WisdomOfAge (through Digital Twin) already signed partnership agreements to offer platform services and engage early adopters.



Fig.2 - Wisdom of Age Launch Go to Market Campaign Timeline for 2023

Product - Solution WisdomOfAge platform

WisdomOfAge is a business platform that takes advantage of the experience and background of people over 55 years old, enabling them to share their knowledge and solve specific problems for industrial companies. This collaboration includes on-line courses, training, projects management and other specific topics requested by companies. The platform end-users are grouped into two large categories: the seniors acting as mentors or teachers, and the industrial companies acting as beneficiaries or students. As WisdomOfAge solves problems of active industrial partners they ensure the sustainability of the platform which is free to use for all the senior mentors. WisdomOfAge is based on the concept of e-learning platforms` technology, extending it towards a creative and open environment where ideas are shared and issues are solved. The benefits for the senior mentors cover multiple areas: (1) financial support, (2) active ageing, (3) social integration, and (4) societal development through their experience. A challenge for the development of the platform is the creation of an intuitive and easy to use interface that will offer both mentors and students a pleasant experience in using the platform. By involving users from the initial stages of development and using the latest available technologies, the project team created a modern platform adapted to all types of users (figure 3).



Fig.3 - Correlation between Start-ups & SMBs problems, Elderly Mentors needs and the study conducted by the consortium

Added value versus competitors

Regarding the competition, all the platforms identified and analyzed by us are some general ones, especially Business to Consumer, and none of them offer a clear focus for the digital transformation of the industry and the transition to Industry 4.0. They are not dedicated to the elderly, they are not intuitive, they promote content at the beginner level. They also do not offer support services for the elderly, and do not present the benefits of mentoring as an effective form of learning or knowledge transfer. Wisdom of age comes with important competitive advantages over competitors, both in terms of included functionality, but especially in the way it better serves the needs of customers. Figure 4 represents a comparative table of these aspects and the positioning of the platform against competitors.

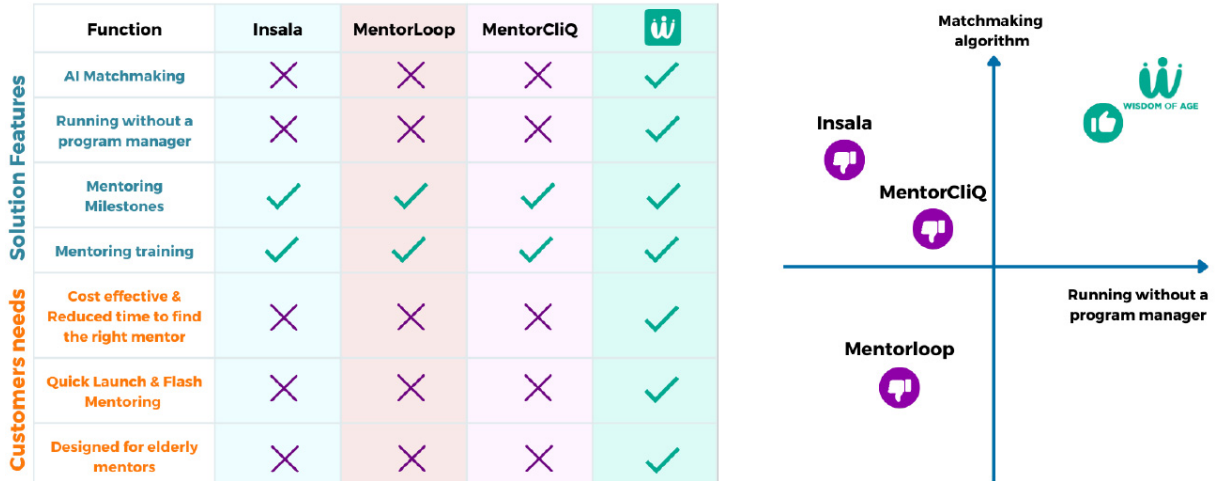


Fig. 4 - Competitors analysis and Positioning of the platform

Lean Canvas model

The user base for the WisdomOfAge platform consists of two separate groups (mentors and companies) which have specific needs and requirements which need to be assessed independently [Vaida, et al 2021]. In the early platform development these needs were studied through participatory design to correctly identify the specificity of each group [Riessenberger, et al 2022]. We used the Lean Canvas (table 1) to improve our business plan and to easily communicate with all the partners involved in the project during the development phase. This method offered us value orientations, focusing on what is important for success, a fast, clear and flexible approach.

Table 1. Lean Canvas Model for WisdomOfAge

Lean canvas object	Lean Canvas for Mentors	Lean Canvas for Companies
Customer Segment	Retired experts (tech, engineering and IT) Seniors who wish to work Older employees who want to work in additional projects	SMEs Start-ups
Early adopters	Adults (55+) Expertise in the field of technology (Automotive, Aerospace, Machinery), computer science, and engineering from Romania, Belgium, Switzerland.	Existing Digital Twin customers in Romania Members of Automotive Suppliers association Members of Factory 4.0 - Digital Innovation Hub
Problems	Desire to continue working even after retirement in the former field of work. Difficulties to stay active/ be socially engaged COVID-19 social restriction Increased retirement costs Experience of seniors vanishes from the labor market	Lack of specific experience, knowledge. The costs of an expert consulting. Difficult to find customized training/consultancy. Lack of networking (difficult to connect with experts). Difficulty to organize in person meetings with consultants due to the COVID-19 restrictions.
Existing Alternatives	Job platforms for seniors: Rent a Rentner (CH), Nestor (BE), Sixie (BE) Networking platforms: LinkedIn Timebanking Municipal organizations Self Employment (consulting basis)	
Revenue Streams	The platform is free for mentors.	Detailed revenue strategy is described in the Business Model.
Solution	WisdomOfAge Artificial Intelligence (AI) matchmaking Facilitates keeping work experience on the labor market A model that adapts to the time capacity of seniors (Flexible consulting) Facilitating social engagement Facilitating remote activities suitable for the post-pandemic reality	AI matchmaking tool using machine learning which matches the customers with mentors based on the skill desired and the level sought. Encompassing platform offering an end-to-end process from matching, and secure payment system. Available on demand.
Unique Value Proposition	Wisdom of Age creates a unique opportunity to age well in a digital world. Using artificial intelligence and user-friendly interfaces, it helps senior mentors to stay connected, be active, and share their valuable experience for the benefit of the younger people who now work in industrial companies.	Our AI based platform offers specialized and customized knowledge from experienced professionals to transform your business. Wisdom of Age gives you quick access to cost-effective networking.
Channels	Recruitment through existing networks (IAF, HA) Direct phone calls to existing contacts Presentations in organizations for the older adults Online marketing and advertising (Google Ads, AdRoll, Bing Ads, content marketing) Social media (articles) Events (conferences, fairs, conventions etc.) Through mentees (they can contact their former employees)	B2B approach with business partners in each market. direct phone calls to existing contacts 1-1 presentations online marketing and advertising (Google Ads, AdRoll, Bing Ads) Social media (articles) events (conferences, fairs, conventions etc.) through mentors and professional associations
Lean canvas object	Lean Canvas for Mentors	Lean Canvas for Companies
Key Metrics	Registrations on the platform Profiles of seniors on the platform Activities on the platform Matchmaking Time spent on the platform/frequency	Business performance: Conversion rate Number of customers Customer retention Number of leads Costs control

	Number of sessions / recurrent customers/business Churn rate / retention rate	Repeat purchase rate Product performance: AI Matchmaking accuracy Number of tickets/errors
Cost Structure	Labor costs (developers, marketing, administration, staff for sales force) Advertising costs, participation in events Hosting costs for platform Developing costs for algorithm → covered by labor costs Overheads (rent, loan, electricity bills etc.) Travel costs Costs for IT Software for research	Labor costs (developers, marketing, administration, staff for sales force) Advertising costs, participation in events hosting costs for platform developing costs for algorithm > covered by labor costs overheads (rent, loan, electricity bills etc.)
Unfair Advantage	Early engagement of older adults in the development process (End User-Testing) Consortium network (End Users Organizations) AI/ML Recommendation system to match mentors-mentees Guidance/accompaniment of the development of the platform by social scientists and tech Interdisciplinary / international exchange	Existing customers in Romania Consortium expertise in AI Digital Twin's team experience and skilled professionals End user organizations support Retired mentors form our customers

Business model

WisdomOfAge is a platform business model that creates value by facilitating exchanges between two or more interdependent groups. The category of service providers is represented by mentors with experience in the technical field who are more than 55 years old, and the other category we have clients (mentees) who can be start-up time companies, medium or large enterprises.

In order to make these exchanges happen, platforms harness and create large, scalable networks of users and resources that can be accessed on demand. Platforms create communities and markets with network effects that allow users to interact and transact. In the old model, scale was a result of investing in and growing a business's internal resources. But in a networked world, scale comes from cultivating an external network built on top of your business. This is the essence of how platform business models work.

Business use-case model

A start-up company is asked to optimize a manufacturing process. It is a unique opportunity to expand their business. The company has expertise in robotics, but they need external help with production planning. They do not have the time to develop necessary skills, nor the budget to hire a consultancy company. They only found general information on the internet. Approaching the WisdomOfAge platform, they follow the next three steps (figure 5):

Step1: An employee discovers the Wisdom of Age platform, creates an account and easily posts a request for a manufacturing mentor with extensive experience in production planning.

Step2: Our matchmaking platform quickly analyses all existing mentor profiles and recommends the most suitable mentors for the specific request of the start-up company.

Step3: Based on the suggestions, the company selects the best mentor and the mentoring journey begins.

The companies are able to successfully finalize new projects, while the mentors are glad to remain connected with the industry, share their valuable experience and increase their income for a better life.

Our platform reshapes the future of mentoring, supports senior professionals to remain active and age well in a digital world while democratizing access to knowledge for companies.



Fig. 5 – User Journey for Mentees

Pricing is one of the most essential elements of the business, and it plays a major role in determining whether the business will fail or succeed. In order to ensure that we have an intelligent and efficient pricing strategy, we have used several methodologies for a correct positioning of the services offered by WisdomOfAge on the market. Thus, in elaborating the prices for the matchmaking services offered by the platform, we analyzed information from 4 different categories:

1. Evaluate pricing potential, analysis of competitive prices
2. Willingness to Pay, studies with our end users to identify their preferences for purchasing our services.
3. Operating costs (maintenance, marketing and sales)
4. Revenue goals, brand positioning and target audience

For the first 6 months after launch, we will use the following pricing policy for services.

Basic: 250 Euro per mentor

Free mentoring request and fixed price for access to each mentor profile.

Project based pricing - this is an affordable way for customers to discover our solutions and benefits. The cost is low for a company, it will not be a barrier and there is a good chance that most customers satisfied with the services will upgrade to standard or pro options in the future.

Standard: 500 Euro per request

Fixed price for a mentoring request and free access to all suggested mentors for this request.

Value Based - this is based on what customers are willing to pay. According to our studies, this is the mode preferred by most potential customers. After the success of this pricing option, customers will upgrade to the Pro package and become loyal customers.

Pro: 1000 Euro per year

Subscription fee for unlimited service access.

Premium price - the price will be paid annually by the platform's clients and will allow them to send an unlimited number of mentoring requests and to access all mentors who will be recommended for each request.

Freemium Pricing - will be used for key partners of the platform to attract early adopters, to involve them in testing and to attract more customers. With access to their email inboxes, phone number.

Discussion and conclusions

The development of an efficient business model and commercial strategy is very often a deciding element for the success of the investment despite its performance. The marketing strategy for an on-line platform, WisdomOfAge, was presented. This platform addresses a well-known European challenge, namely an ageing population, which further leads to natural consequences: increasing retirement costs on the government side, an unexploited potential of knowledge and experience from the seniors on the industry side, and a feeling of uselessness on the seniors' side. WisdomOfAge provides also a competitive solution on the post-pandemic reality, considering the seniors represented the most endangered population segment of COVID-19. To ensure the marketing success, the platform development included the achievement of an AI based matchmaking tool that ensures the efficient pairing between the senior mentors and the engineering companies. As the two user groups have different needs independent surveys were conducted for mentors and companies, as illustrated in the Lean Canvas model. The business model targets the companies both as beneficiaries and payers to support the commercialization and market success. The European scalability must ensure the growth of all the involved actors to achieve a successful balance between supply and demand.

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TOOL/PLATFORM FOR PARTICIPATIVE CULTURE IN POST-PANDEMIC ECONOMY CASE STUDY

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Abstract

Purpose – The paper presents a case study of an innovative digital platform that contributes to the consolidation of participative organizational culture and bonding between employees in the challenging post - pandemic reality.

Methodology/approach – For this case study, there first was studied the application and the documentation we were given access to. Afterwards we conducted interviews with the core development team and users of Digital Democracy platform and the last stage was to conduct workshops to evaluate the expected impact.

Findings – Although the presented tool was initially destined for other purpose, we find it's valuable impact on cultures of challenged organizations in post-pandemic time.

Research limitations/implications – The case study concludes the information's received by the development team of the Digital Democracy platform and its beneficiaries.

Practical implications – Possible implementation of staff, members, colleagues engaging platforms and further development possibilities of the platform.

Originality/value – Although the instrument was initially designed to increase the civic spirit in communities, it proves itself very useful to combat personnel fluctuation in organizations. For a period, it's "side-effects" have proven to have a more valuable immediate impact.

Key words: Social dialogue, Participative organizational culture, Community, Digital platform, digital democracy

Introduction

How does post-pandemic reality change organizations around the world? What are the new challenges for employers in a mixture of hybrid work conditions? How do Human Resources Managers react to this? What are the significant factors that keep people together in organizations? What role plays the participative culture and how does it fit with hierarchy discipline? What changed after the covid lockdowns? These are some basic questions witch answers could bring some clarity in these unstable times.

In our opinion, the new reality described by remote job opportunities and social distancing is shaping the organizational performance in many fields. Except the few segments, where people are geographic or work specific restricted to the workplace, remote work opens a completely new opportunities and also challenges for both managers and employees.

At the same time, after spending so much time in "social-distancing" people start to be more and more selective with where and for what they decide to spend their time and involvement. Massive resignation phenomena appear all over the world. One of the key questions for employers nowadays should be the reiteration of mission-vision and the strengths of their own organizational culture! In democratic countries, it is no surprise that employees are more productive, better performing and have a higher involvement in participative organizational cultures. Together with the "sense of belonging" and

identification with the organizational values, participative culture is highly contributing to high performers retention.

One of the instruments that actively contribute to participative organizational culture in organizations is Digital Democracy platform. This digital platform was designed and first developed by a core team from Cluj-Napoca, Romania. This case-study presents the benefits this innovative tool can bring into organizations.

About the online platform Digital Democracy

How did the platform Digital Democracy start? Alexandru Boc, founder of Digital Democracy and his team explained the founding principles and the idea behind the platform:

Started in 2016 with the design of the concept. Initially the plan was to create an application dedicated to urban local Romanian communities, but later, the concept was extended for larger communities like counties or even countries.

The need: First, there was an analysis regarding how democracy will evolve, and the analysis of the status-quo and the fields where democracy is not yet using the best technology -which in our opinion is the digital one. In order to help engage and involve as many actors as possible like NGO's, companies, citizens, and public institutions, there was a need of a digital application which can provide real time transparency and efficiency.

Motivation for starting the project was the desire for a better world! The natural evolution of democracy will make us use of digital tools. The team designed a special concept for communities with five major fields of interest: Education, Health, Economy, Public Administration and Entertainment.

Regarding the mission of Digital Democracy, it is designed to significantly grow the level of democratic exercise world-wide starting down top starting with the local communities. Our role is to build the best mobile app to help and facilitate the engagement of people and authorities and boost the level of appreciation regarding the democratic values.

The target of the platform is to bring together for initiatives, events and polls, in our opinion, four main actors in a democratic society: Citizens, Companies, NGO's and Public Institutions.

The solution of a digital platform came because the digitalization is for now, the most accessible technological solution and democracy is, in our opinion the best organizational form.

The development level of democracy will evolve, but it can also devolve. This is why it is important for us all to get involved in the communities we live in. The easiest and most accessible way to do so, is by using the designated applications from used on various devices, like smartphones.

Key aspects regarding the Digital Democracy tool

The developers of Digital Democracy tool present that their vision is to live in a society where the societal challenges and problems are solved with the direct and real-time input of the citizens and stakeholders involved. Also, the mission is to increase the level of democracy around the world, from local communities to global ones by creating the best digital tool for increasing democracy awareness and involvement.

The main role of the Digital Democracy platform is to solve the problem of difficult interconnectivity between social stakeholders: Government, Companies, NGO's and Citizens, which actually has in their opinion four main causes: low civic participation, lack of digitalization, excessive bureaucracy and lack of meaningful data. Data without an algorithm and transformed in added value, is just trash.

The platform was first designed as an MVP product, prepared for a seed funding. Currently it is launched in a beta version for over 600 beta users. The interest of usage, after come marketing investment raised to over 68k interested users.

According to the data, we mention some key figures. The first indicator, according to the Public Opinion Monitor of the European Parliament, in 2020, 52% of EU citizens don't interact with NGOs. As shown in

Figure 1. Engagement level with NGO in the European Union, in countries that joined the Union later, the rate of engagement with NGO's is far lower.

The bureaucracy is another important aspect. There is around 5 billion € potential cost reduction in EU with digital bureaucracy and also taking into consideration that in 2019 there was a 50.6% turnout in EU elections.

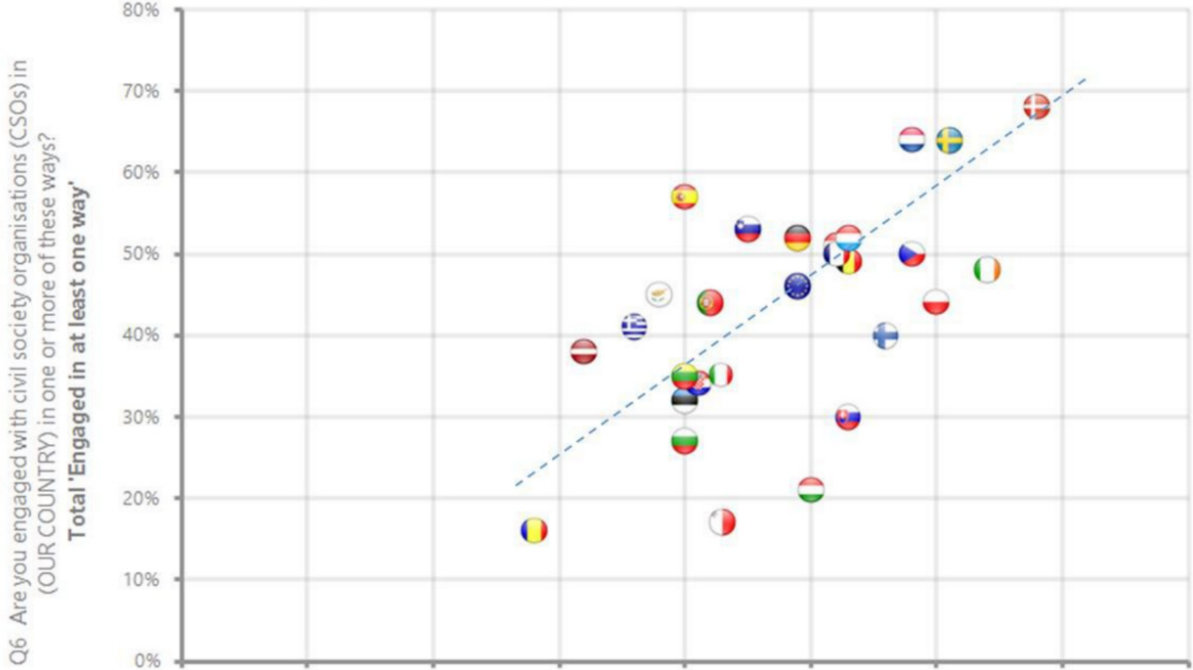


Figure 1. Engagement level with NGO in EU (Source: Public Opinion Monitor of the European Parliament)

The Digital Democracy team considers bringing a solution consisting in a “unique e-democracy platform connecting four stakeholder groups with the purpose of initiating discussions and work towards solving challenges. By connecting on five focus areas (Education, Health, Economy, Entertainment and Public administration) the four actors (Citizens, NGO's, Companies and Public Institutions) through their innovative mobile app.

From initial goal to valuable “side-effects”

The main reason why we present this specifically this case study is because of it's valuable side-effects.

Initially, the Digital Democracy application was developed in order to increase interorganizational collaboration, civic engagement, to strengthen communities, to bring main social actors together and help them interact on main categories of interests.

Now, in the post-pandemic reality, organizations have to consolidate their internal culture in order to face the great resignation trend, stability and sense of belonging are key aspects which influence the personnel retention. Already, many employers define their organizational structure as a community and the idea of creating participative organizational culture at least at some levels of rather less important business matters becomes more and more attractive to human resource directors and top management.

In these times, the Digital Democracy application can prove very useful for organizations. The possibility to set the access to their own organization, as shown the micro-organizational community brings great value for each organization. Members or employees can interact, collaborate, participate in certain topics of interest. Of course, the topics are highly adapted to the companies or organization needs.

Thus, a new filed of application for this platform, the stability of personal structure, reveals new beneficiaries for the original Digital Democracy application: organizations. The larger the structure, the more impact, such an app can bring into the organization. Practically having a employer engaging

platform where each employee manages its profile, work, career, results and performance indicators in a digital passport in collaboration with the employer.

Discussion and conclusions

In the post-pandemic reality, bringing together and retain top performers is a major challenge. The organizational shift from “employers” to “community members” is already happening and employees appreciate the “sense of belonging”, while a participative organizational culture, where “their opinion matters” is crucial to keep motivated high performers.

As digital technology creates easy access to information and facilitates interaction, digital platforms and applications are highly appreciated and become indispensable tools in management of HR and organizational culture. Digital Democracy, the application presented in this paper is one example. Although the application was designed before the pandemics for its initial goal, it proves herself very useful in post-pandemic times specially to strengthen internal collaboration and the participative organizational culture.

Trends appear and organizations and communities must decide in which way they should focus on and spent resources. One way is to encourage interorganizational collaboration, which before the Covid-19 pandemic was rather the mainstream. The other option is rather to focus on the internal community, which now, in post-pandemic times is a must to counter the great resignation phenomenon. Since digitalization is already very accessible and social media platforms already impact the mindset and interests of the employees or community members. The level of courteousness between key players on allocating resources rather to interorganizational collaboration versus internal collaboration remains a further research topic as well as the effort and investment that employers make to strengthen the internal communities.

Notes

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Employers' Organization for Research and Digitization considers that the development of innovative products in Romania should be encouraged, also through the documentation and presentation of case studies. The presentation of this case study does not have any commercial interests.

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ASPECTS REGARDING THE EMPLOYEES BENEFITS IN THE POST-PANDEMIC REALITY

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Abstract

Purpose – *The purpose of this paper is to present the local trends and evolution of the extra-salary benefits market in Romania in the post-pandemic economy.*

Methodology/approach – *We organized a study on major players in different economic sectors. The data is collected from employers mostly from the private sector. We analyzed the data in perspective of official numbers from the National Institute of Statistics of Romania.*

Findings – *In this paper we present the latest trends in the field of extra-salary benefits market at national level, in Romania in the post-pandemic economy.*

Research limitations/implications – *The data reflects information at national level, in Romania, mainly from employers acting in the private sector in various industries.*

Practical implications – *The results presented in this paper can be actively used in adapting the extra-salary benefits by interested users and it represents a radiography of the trends brought in the post-pandemic economy regarding the employee's appreciation of extra-salary benefits in Romania.*

Originality/value – *The results of this paper can be guide for any actors involved in the elaboration of the human resource management strategy for short and mid-term from small, medium companies and NGO's to branches of multinational holdings acting in this market.*

Key words: *Economy, Workforce Trends, Human Resource Management, Benefits, Great Resignation*

Introduction

The global challenges brought by the 2020 Covid-pandemic deeply changed the social context all over the world. Habits, social conventions and routines are changing, and these changes have direct impact on the way of understanding the way we work.

Multiple causes with direct interaction or not shape the way people report themselves to their professional activity as employers or employees. From social distancing during the pandemic to social unrest, from global record inflation to the highest rate of digitalization and automation, from security concerns in Eastern Europe to the polarization of the societies, governments are facing new challenges and take actions in modifying the taxation systems, entrepreneurs are struggling to survive in a high rate changing environment and employees change their habits and their relation to the employing institution.

In the struggle to keep the best performers and reduce the personnel fluctuation, business owners and human resource managers allocate special attention to the extra-salary benefits.

Major social phenomenon as “the great resignation” (Serenko A.) or “the great reset” are already highly studied and shape our modern world.

A fierce competition to ensure high performing key persons in the companies has started long time ago. In these challenging times, the competition only becomes more intense. Hybrid work, office work versus remote work offers a new range of possibilities and also challenges. Workplaces have changed completely, and a lot of barriers were removed. Work is now result oriented, not volume oriented, especially in the office jobs.

Donald Sull et al present in the paper “Toxic culture is driving the great resignation” published in MIT Sloan Management Review, 2022 that “More than 40% of all employees were thinking about leaving their jobs at the beginning of 2021, and as the year went on, workers quit in unprecedented numbers. Between April and September 2021, more than 24 million American employees left their jobs, an all-time record. As the Great Resignation rolls on, business leaders are struggling to make sense of the factors driving the mass exodus. More importantly, they are looking for ways to hold on to valued employees...The Great Resignation is affecting blue-collar and white-collar sectors with equal force. Some of the hardest hit industries — apparel retail, fast food, and specialty retail — employ the highest percentage of blue-collar workers among all industries we studied. Management consulting, in contrast, had the second-highest attrition rate but also employs the largest percentage of white-collar professionals of any Culture 500 industry. Enterprise software, which also suffered high churn, employs the highest percentage of engineering and technical employees.”

The 2021 Work Trend Index: Annual Report published by Microsoft shows that “41% of employees are considering leaving their current employer this year and 46% say they’re likely to move because they can now work remotely” and George Anders, Senior Editor-at-Large at LinkedIn says, “Remote work and migration patterns open up so many interesting jobs to people who may otherwise have had a hard time gaining access to them.” So, as boundaries fall apart, new opportunities appear for high potentials, and stability becomes a great challenge for employers.

In this context, one of the differentiators for keeping the staff turnover under control is the benefits package that could make employees decide to keep their loyalty for the company and have productive results.

Methodology and Analysis

The research was conducted by analyzing an employer benefits platform that gathers 20k companies with over 900k employees that delivers benefits from an ecosystem of over 65k partners that offer their services on the platform, mainly to private employers. Some of the presented output represent the results of mixed data sources, both from benefits platforms and official data from National Institute of Statistics in Romania.

We focus on presenting trends and decisions made by employers and consumers/employees regarding flexible benefits. In order to reveal the trends and highlight the different approaches, we excluded fix benefits like meal vouchers.

Our first result reflects the value of extra-salary benefits in Romania, which has an increase of budgets of almost 95% over the last five years. This significant increase reflects the importance of the impact on HR budgets with benefits. Because of the inflation and continues pressure for increasing the wages, employers look to the alternative of benefits, especially because of the economic benefits to the company, due to certain tax exemptions.

Furthermore, in 2022, industries like services and IT, have the highest benefits budgets per employee with 7.8% above the average, while in retail and production have lower budgets for employee benefits, as shown in figure 1. “Benefits budget sector variations from average per industry in 2021” in Romania based on platform data.

While taking into consideration industry relative differences on personnel costs, we show the impact that benefits budgets have on total personnel budgets in percentages. For this, we use official data regarding the average salary per economic sector from Romania National Institute of Statistics and illustrate the differences in Figure 2. “Average gross salary per industries in 2021, in RON”. We can see that in the segments of IT and financial services the gross salary is almost double than in sectors like retail or industry.

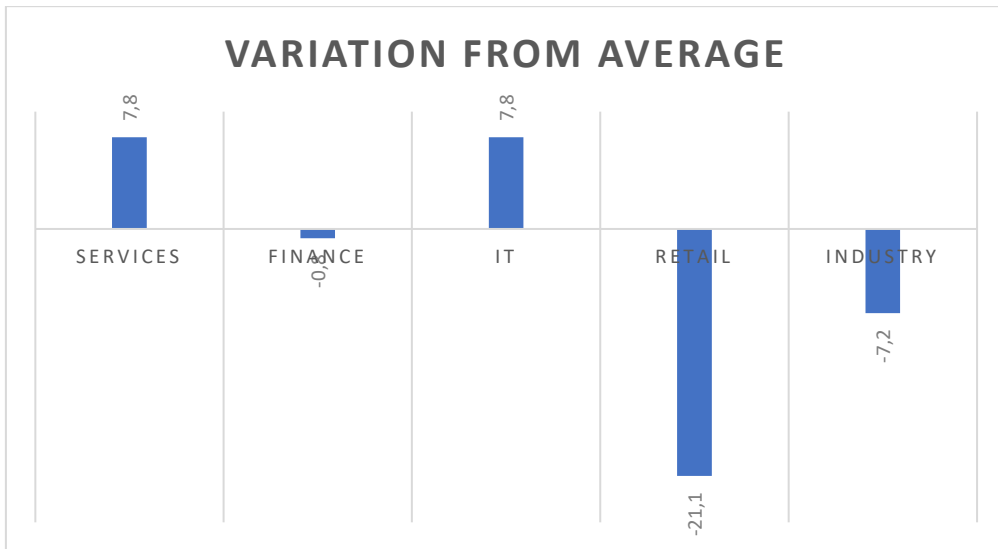


Figure 1. Benefits budget sector variations from average per industry in 2021.

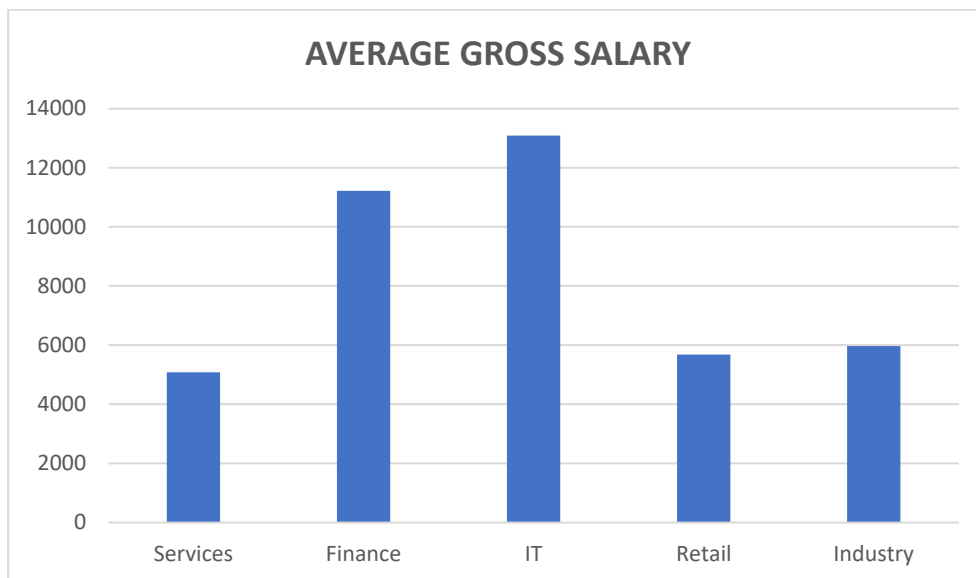


Figure 2. Average gross salary per industries in 2021, in RON.

In economic sectors with a lower average of gross salaries, the impact of extra-salary benefits plays a more important role. We will illustrate the impact of benefits costs on total personnel costs in Figure 3. "Cost impact relative to salary" costs. The impact is presented in percentages of benefits costs on the personnel costs.

We observe that the field of services affords the greatest ratio benefits budget versus total personnel costs. As a general trendline, while the differences on benefits budgets between sectors are relatively reduced, great differences appear on gross salaries between sectors. As a mention we could consider following statement: the lower the average salary, the more important the benefit package.

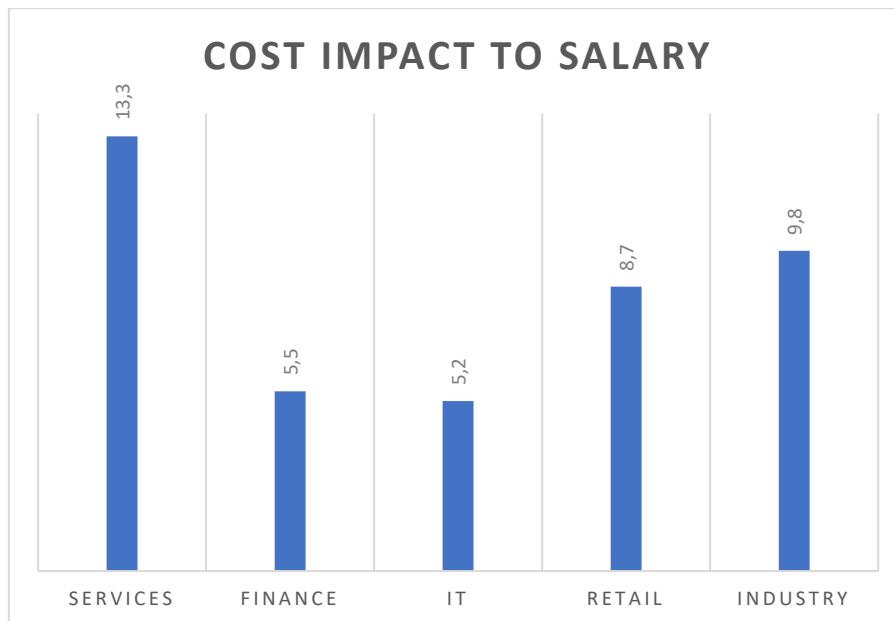


Figure 3. Cost impact of benefits package relative to salary costs (2021)

Another interesting phenomenon appears when we study the appreciation of certain categories of benefits by different age-groups. Figure 4. “Employees preferred benefits based on age-groups”. In this figure, we have three different age groups, “Junior” with under twenty-five years, “Mid” who represents all the employees in the range of twenty-five and forty, and “Senior” representing all employees over forty. On the other hand, we have three segments of benefits. The first one represents products, gifts, general items, which by being obtained as “benefits” do not need to be bought from the “personal budget”. The second segment is represented by experience. Here, the budget is spent for: holiday vouchers, travel or participating at different events. The third segment is represented by health insurance, access to medical treatment or contribution to private pension funds. The preferences of the active employees are for the younger generation in favor of objects or gifts, the middle generation is more balanced between gifts and personal experience, while the senior segment prefers personal experience and a greater concern on health and safety.

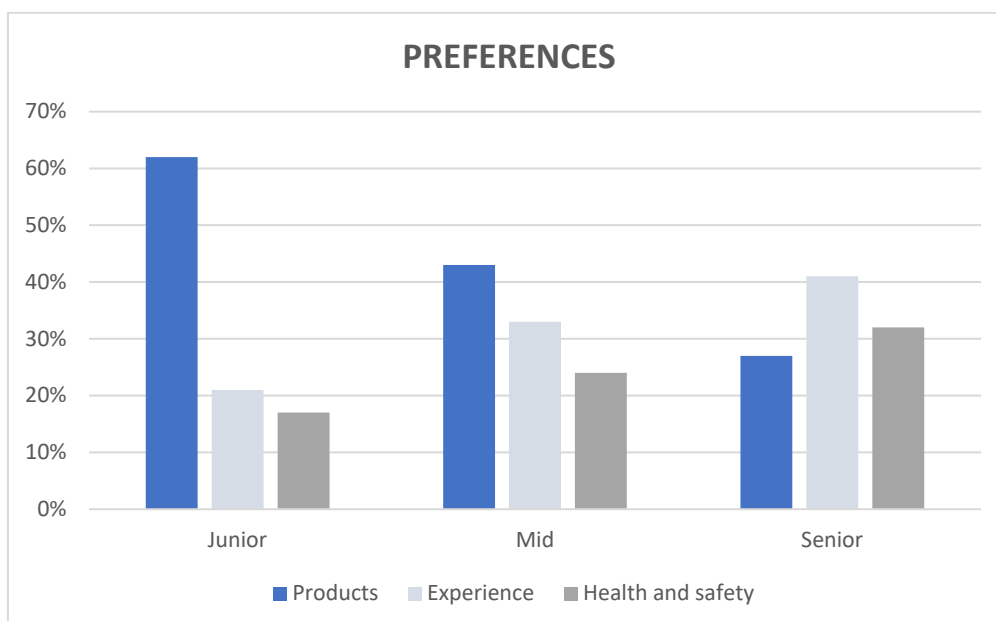


Figure 4. Employees preferred benefits based on age-groups.

Discussion and conclusions

As our first conclusion, a well-adapted policy of benefits can lower the personnel fluctuation through a greater employee satisfaction rate, while optimizing the company costs. In contrast, an inflexible set of poorly selected benefits can cause a great amount of unproductive costs for the company. For example, the compensation of dental services at a certain dental office was not at all appreciated by employees.

The mastery of the so-called benefits that fit the employees' expectations can make a great difference. In the ideal case, a flexible platform of benefits, that allows all single employees and employers to choose the desired benefits will eliminate wasted budgets and ensure a greater positive impact of the benefits. Electing the benefits can also represent a great chance to involve the employees to achieve a greater engagement rate.

A second conclusion would be that the industries with a lower salary average have a greater interest on benefit packages, since the total impact on personnel expenses has a higher proportion. If in some sectors, certain packages of benefits are considered as elementary conditions, in other segments, the benefits package can still be a differentiator from the competition.

Our third conclusion is that with time, the preferences of how to spend budgets change with age. If younger generation appreciates mostly shiny gifts and products, the older generation appreciates a lot more the personal experiences and investment in health and safety.

Notes

While analyzing the extra-salary benefits, we only consider those benefits accessible to all the employees of the organization. We did not take into consideration special benefits for management or certain categories of key persons. Also, we do not include financial bonus-systems dependent on individual or team performance nor bonus-systems based on the loyalty to the company.

Other common-sense HR practices, like individual performance evaluation, career planning and promotion possibilities were also not taken as benefits, even though, certain companies present them as such.

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TEACHERS' AND STUDENTS' PERSPECTIVES ON THE ONLINE EDUCATIONAL ACTIVITIES IN THE COVID-19 PANDEMIC CONTEXT – THE CASE OF AN EXTENSION OF A TECHNICAL UNIVERSITY

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Abstract

Purpose – The paper offers a dual perspective, of both teachers and students, on various aspects related to the online educational activities organized and implemented in Bistrița university extension of the Technical University of Cluj-Napoca, during the COVID-19 pandemic.

Methodology/approach – Two surveys were carried out, targeting students and academic teachers of Bistrița extension of the Technical University of Cluj-Napoca. 195 students and 80 teachers took part at the research, representing 49% of the university extension's entire student population and 64% of academics teaching at this extension in the 2020-2021 academic year.

Findings – Approximately one quarter of the teachers and only 7.7 percent of the students consider that online teaching has a higher effectiveness than traditional teaching. One third of teachers and only 17 percent of students are dissatisfied or very dissatisfied with their overall experience related to online educational activities, but 75 percent of teachers and almost 60 percent of students are satisfied or even very satisfied with their own performance during the online educational activities. The two populations have quite different perceptions regarding students' active participation during online classes.

Research limitations/implications – The results reflect the perspectives of teachers and students from only one of the four university extensions of the Technical University of Cluj-Napoca, the one located in the city of Bistrița.

Practical implications – The usefulness of these results is placed in the post-pandemic context, as the higher education system in Romania is in the process of being reconfigured to a certain extent, such that it adds an online dimension for complementing the traditional teaching and learning activities. The results can be used at Technical University of Cluj-Napoca's internal level, for supporting decisions related to organizing educational activities in its four extensions.

Originality/value – This article contributes to enriching the literature on educational processes at higher education level in the COVID-19 pandemic context, providing evidence from one university extension of one of the largest technical universities in Romania and encompassing the perspectives of two essential stakeholders of these processes, students and teachers.

Key words: pandemic, higher education, online education.

Introduction

Two years and a half after the COVID-19 pandemic emerged, it is clearer than ever that this sanitary crisis raised unprecedented challenges to both individuals and organizations across the globe. Most of the individuals worldwide were suddenly confronted with challenges on various levels, from health to social and emotional issues, from work-related aspects to financial ones, and as such, they had to reconfigure the activities related to almost every aspect of their lives, both at personal and professional levels.

In particular, education institutions and students at all educational levels, from primary education to higher education one, were almost overnight confronted with a new reality they have never experienced before and were forced to identify solutions for carrying out educational activities in completely

unparalleled uncertainty conditions. The transition from face-to-face educational activities to online ones was extremely abrupt and challenging for all the stakeholders involved in the educational processes.

The body of research and literature that emerged in these new conditions, addressing the impact of challenges faced by the educational system on its stakeholders is very rich, bringing evidence of the effect of the pandemic crisis on the educational, social or emotional lives of these stakeholders, especially on students and teachers. Romania's particular situation is not an exception in this context, with various researches carried out in order to investigate the perceptions of students or teachers about the online teaching and learning processes generated by the pandemic crisis (Coman et al., 2020; Edelhauser and Lupu-Dima, 2021; Potra et al., 2021; Alexa et al., 2022; Curelaru, Curelaru and Cristea, 2022; Deaconu and Olah, 2022; Gavriliuță, Dalban and Ioan, 2022; Spunei, Frumușanu, Muntean and Mărginean, 2022).

The Technical University of Cluj-Napoca (TUCN) is one of the largest technical universities in Romania, with more than 18000 students enrolled in undergraduate and master programs in the 2021-2022 academic year and over 900 academic and research staff. The university has 12 faculties in two university centers in Cluj-Napoca and Baia Mare, as well as four university extensions in four major cities in the region: Alba Iulia, Bistrița, Satu Mare and Zalău (Technical University of Cluj-Napoca, 2022). The study programs which TUCN organizes in its four university extensions follow the same authorization and accreditation process as all the other programs that are part of TUCN's educational offer in Cluj-Napoca.

Bistrița extension is the largest of the TUCN's four university extensions according to number of students. Its educational offer includes four undergraduate programs and two professional master programs coordinated by two of the TUCN faculties - Faculty of Industrial Engineering, Robotics and Production Management (three undergraduate programs and two master programs) and Faculty of Electrical Engineering (one undergraduate program). The four programs offered in Bistrița extension at undergraduate level are "Industrial Economic Engineering", "Robotics", "Digital Production Systems" and "Medical Engineering", whereas the two master programs are "Robotics" and "Management Quality and Engineering".

The students enrolled at TUCN's extensions, Bistrița extension included, follow the same curricula, obtain the same engineering bachelor or master degrees like their colleagues enrolled at the university's faculties in Cluj-Napoca and in addition, most of the academic teachers that teach in these extensions are the same teachers that carry out educational activities in Cluj-Napoca. However, the extensions also present some specific features, one of the most important being that the schedule of educational activities is not the same as the one adopted for activities with students in Cluj-Napoca. The TUCN's undergraduate students in Cluj-Napoca attend educational activities from Monday to Friday, their school schedule typically starts in the morning and usually meet an academic teacher once or twice a week, during the entire semester, for an average of two hours each week for every lecture or practical activity within the context of a specific subject.

On the other hand, at TUCN's extensions the educational activities usually start at noon and can continue up to nine o'clock in the evening and classes can also take place on Saturdays, not only on weekdays. This schedule fits the specific needs of the extensions' students, as many of these students, especially those in the 3rd or 4th year of their undergraduate studies, not to mention the ones enrolled in master programs, already have jobs and they need to combine their activities and responsibilities as employees with the demands of being higher education students. In addition, most of the academic teachers teaching at Bistrița extension make the commute from Cluj-Napoca to Bistrița, which is located 120 kilometers away from Cluj-Napoca and therefore they don't commute to the extension to carry out only a class of two hours with the students and come back to Cluj-Napoca, but rather the activities of their subject are organized in a modular schedule, with one teacher having activities for maybe six to eight hours per day, with the same students, for one, two or even three consecutive days, which means that the teacher usually remains overnight in Bistrița.

Before the pandemic, the educational activities in TUCN took place in a face-to-face traditional manner, with all the activities being held at university. In March 2020 the Romanian government adopted various measures for reducing the spread of the new coronavirus, based on social distancing, which also included closing the educational units. As a result, TUCN also entered an emergency online educational mode.

In TUCN, like in all other higher education institutions from Romania, the transition from face-to-face courses to online education initially represented an urgent measure adopted to ensure the continuity of educational activities, with both students and professors not knowing what expectations to have from this transition, nor for how long this solution was going to be used. The transition obviously raised significant challenges for both students and teachers.

On the 11th of March 2022, when TUCN suspended all face-to-face educational activities, the second semester of the 2019-2020 academic year had begun for only a couple of weeks. Given the pandemic situation in Romania, the country entered an emergency state until later in May that year and hence the remaining of the second semester, including the summer session of exams, took place exclusively online. By the fall of 2020, the decision of how to conduct the educational activities in the 2020-2021 academic year was left up to each university in Romania. TUCN decided to begin the academic year in a hybrid mode, with online lectures and face-to-face practical activities (laboratories, seminars and projects). However, only three weeks into the new academic year, the pandemic situation forced the university to switch again to a full online education mode and this remained in place for the entire 2020-2021 academic year.

Research methodology

A research was conducted with the aim of exploring students' and teaching staff's perceptions regarding the educational activities that took place online at Bistrița extension in the COVID-19 pandemic context. Because we wanted to capture the perceptions of both educational stakeholders, two different populations were chosen for investigation: students enrolled in both undergraduate or master studies at Bistrița branch, as well as teachers teaching at this university extension. The two targeted populations consisted of 398 students enrolled in one of the specializations offered at Bistrița extension in the 2020-2021 academic year and of 125 teaching staff that carried out educational activities at this extension in the same academic year.

Among the main research objectives were identification of the perceptions of both stakeholders, students and academic teachers, about various elements related to the educational activities implemented at Bistrița extension: the perceived main advantages and disadvantages of online education, effectiveness of online education compared to traditional one, their perception regarding students' active participation during online classes, their satisfaction level related to everything they have experienced in relation to online education, as well as their satisfaction level with their own performance during online teaching activities.

Two very similar questionnaires were used as research instruments, one targeting students and the second one addressing teachers. There were small differences between these questionnaires, according to the different populations they were developed for. Data collection took place online, using Google Forms platform for collecting responses, at the end of June 2021. At the moment of data collection phase, both the investigated students and teachers populations had experienced online educational activities for more than one year, in the second semester of the 2019-2020 academic year, when Romania was in state of emergency due to the pandemic, as well as during the 2020-2021 university year, when Romania was no longer in emergency state, but in state of alert. The exception from this situation is represented by 1st year undergraduate students, who began their academic studies only in the fall of 2020. Following the data collection phase, 195 responses were obtained from students and 80 responses from the teaching staff population, which account for response rates of 49% of the entire student population and 64% of the teachers' population.

This paper next presents some of the most significant results of the research and attempts to compare the results obtained at both populations' levels.

Results

The main socio-demographic characteristics of both investigated samples are presented in table 1. The distribution of students' sample by gender shows that 54.9 percent of the respondent students are males, whereas the remaining 45.1 percent are females. Almost 70 percent of students have between 18 and 24 years, another 22.1 percent of the sample have ages between 25 and 34 years and the 8.7 remaining percent includes more mature students, that are between 35 and 45 years old. The majority of students, representing 61.5 percent, have residence in urban areas and the remaining 38.5 percent of students live in rural areas. The large majority of students, 82.6 percent, is represented by students

of the Faculty of Industrial Engineering, Robotics and Management Production, with the remaining 17.4 percent being students of the Faculty of Electrical Engineering; this structure of students' sample by their faculty is explained by the difference in the number of undergraduate and master programs offered by each of the two faculties at Bistrița extension. The repartition of undergraduate students by their year of study is relatively balanced. Finally, the distribution of the sample according to students' program of study is the following one: Industrial Economic Engineering (undergraduate, 34.4 percent), Digital Production Systems (undergraduate, 21 percent), Medical Engineering (undergraduate, 16.9 percent), Robotics (undergraduate 14.9 percent), Robotics (master, 6.7 percent), Quality Management and Engineering (master, 6.2 percent).

Table 1. Characteristics of the two samples of students and teachers

Students (195 respondents)						
Gender	Male 54.9%			Female 45.1%		
Age	18-24 years 69.2%		25-34 years 22.1%		35-45 years 8.7%	
Residence environment	Urban 61.5%			Rural 38.5%		
Year of study	Undergraduate 1 st year 19%	Undergraduate 2 nd year 22.1%	Undergraduate 3 rd year 26.2%	Undergraduate 4 th year 20.5%	Master 1 st year 9.7%	Master 2 nd year 2.6%
Academic teachers (80 respondents)						
Gender	Male 65%			Female 35%		
Age	25-34 years 8.8%	35-44 years 51.3%	45-55 years 22.5%	55-64 years 12.5%	65 years or more 5%	
Type of staff	Tenured teaching staff 83.8%			Associated teaching staff 16.2%		
Teaching degree	Assistant professor 7.5%	Lecturer 47.5%	Associate professor 21.3%	Professor 16.3%	Not applicable 7.5%	
Years of study which they teach	Undergraduate 1 st year 28.7%	Undergraduate 2 nd year 41.3%	Undergraduate 3 rd year 41.3%	Undergraduate 4 th year 36.3%	Master 1 st year 15%	Master 2 nd year 11.3%

The other investigated sample, of 80 academic teachers, includes 65 percent males and 35 percent females. Approximately half of the sample is formed by teachers between 35 and 44 years old, with other 22.5 percent having between 45 and 54 years. A large majority of 83.8 percent consists of tenured teaching staff, the remaining 16.2 percent being associated teaching staff. In what concerns the academic titles of the respondents, 47.5 percent are lecturers, 21.3 percent associate professors and 16.3 percent are full professors. In addition, the structure of the sample of teachers by the faculties where they are affiliated shows that the majority of the respondents are teachers of the Faculty of Industrial Engineering, Robotics and Production Management (68.8 percent), while the remaining teachers are affiliated to other faculties, like Electrical Engineering (13.8 percent), Materials and Environmental Engineering (7.5 percent), Automotive, Mechatronics and Mechanical Engineering (6.3 percent) and Automation and Computer Science (3.8 percent).

When asked to express their opinions on the effectiveness of online teaching in comparison to traditional educational activities (figure 1), it seems that online teaching is considered more ineffective than face-to-face teaching, according to the opinions expressed by 53.8 percent of teachers and 44.6 of students. A share of 14.4 percent of students sample considers that online teaching is much more ineffective, however no single teacher selected this option. A third of the students and 22.5 percent of teachers consider that teaching in both environments, online and onsite, has the same effectiveness. Only around 6 percent of each sample believe that online teaching is more effective. An interesting discrepancy is noted for the "much more effective" option, with 17.5 percent of teachers considering that the

effectiveness of online teaching is much higher than that of traditional teaching, but this opinion is shared by only 1.5 percent of the students.

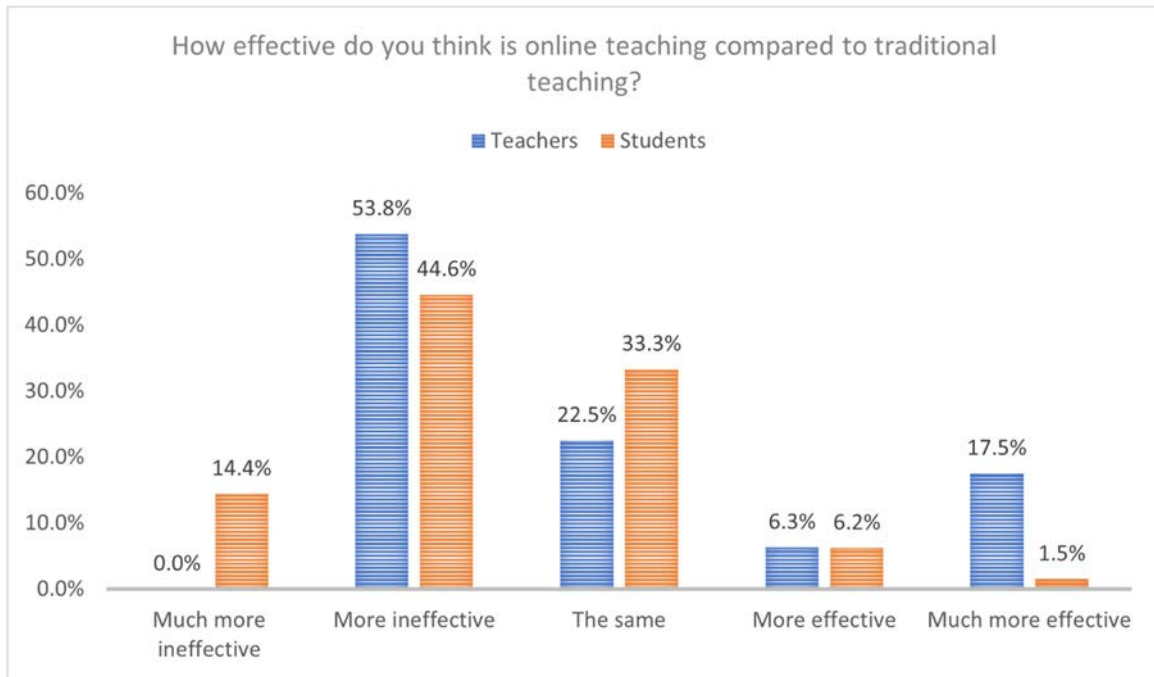


Figure 1. Perception on effectiveness of online teaching compared to traditional teaching

Regarding the active participation of students during the educational activities that took place online, it seems there is a perception gap between how students perceive their own participation during classes and how teachers actually assess their involvement during online activities (figure 2). Most of the students, representing 44.6 percent of the sample, considered themselves as being active during the online educational activities, whereas 41.3 percent of the teachers sample perceived the students as being not so active. Roughly one third of each sample perceived students' active participation at an average level, 36.3 percent of teachers and 31.3 percent of students. While other 8.7 percent of students rated their participation as very active, it can be noted that not a single teacher perceived students' participation during online classes as being very active.

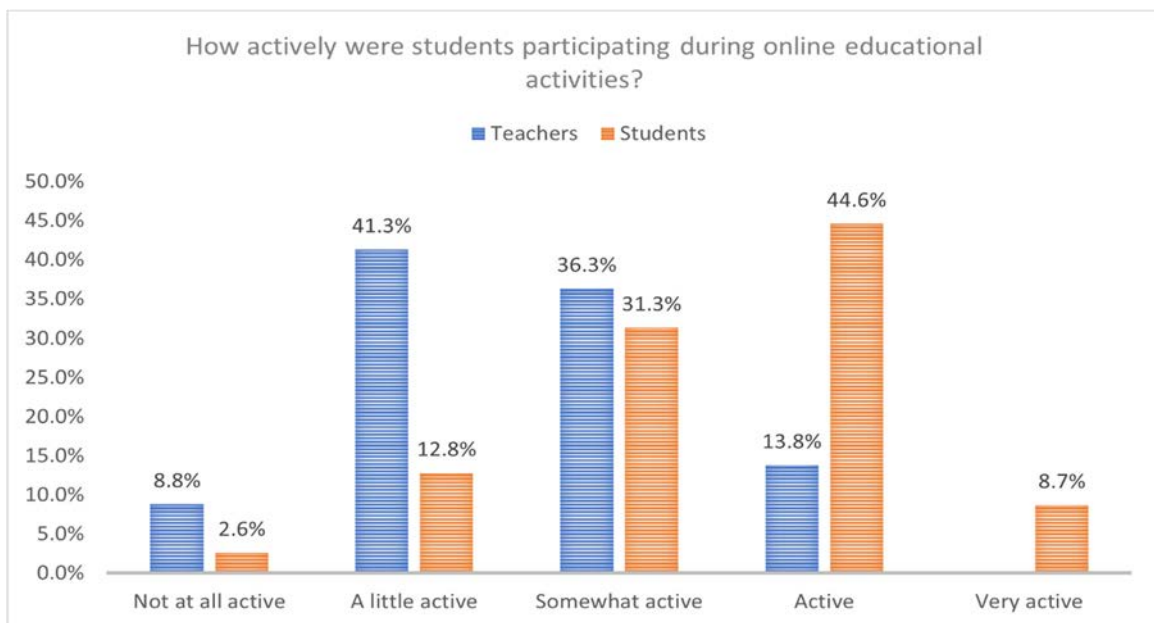


Figure 2. Perception regarding students' active participation in online educational activities

In what concerns respondents' overall satisfaction with everything they have experienced in relation to the online educational activities (figure 3), the largest shares of each sample consist of those respondents that declared they were satisfied in this respect, 33.8 percent of teachers and 41 percent of students. Another third of each sample expressed an average satisfaction, being neither satisfied nor dissatisfied with their overall online teaching and learning experience. However, a notable difference can be noted among those who had an unsatisfactory overall experience with online educational activities, with 30 percent of the teachers being dissatisfied in comparison to only 14.4 percent of students. In addition, small shares of the two samples used the anchors of the used scale, very dissatisfied or very satisfied, to rate their satisfaction level. Within these results, the very low percentage of teachers that were very satisfied with their overall online educational experience should be noted (only 1.3 percent).

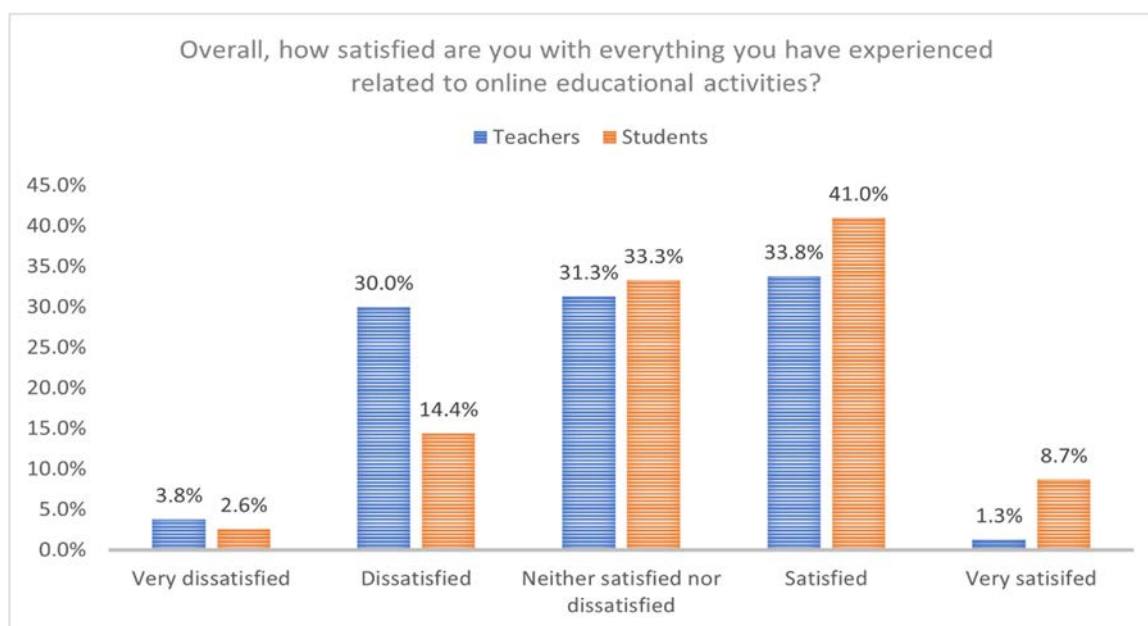


Figure 3. Overall satisfaction with the entire experience related to online educational activities

Figure 4 presents the overall satisfaction of the two groups of respondents regarding their own performance during online educational activities. The majority of each sample of respondents, 58.8 percent of teachers and 50.8 percent of students, are satisfied with their performance. The highest level of satisfaction, very satisfied, is perceived by 16.3 percent of teachers and 8.7 percent of students. An average satisfaction level was indicated by slightly more students (24.1 percent) than teachers (17.5 percent). It should also be noted that only small shares of the two samples were dissatisfied or very dissatisfied with their own performance and additionally no single teacher was very dissatisfied with his own performance during the educational activities that took place in the online environment.

As the research was carried out in June 2021, close to the end of the 2020-2021 academic year, the respondents were also asked which option of carrying out educational activities they feel would be more appropriate for them in the next academic year (figure 5). Hybrid education was the most preferred option for 58.8 percent of teachers and almost half of students (47.7 percent). A little over one third of the teachers (36.3 percent) would have preferred for the activities in the next academic year to take place exclusively online, with 27.7 percent of students considering this option as the most suitable one for them. A much higher discrepancy between the two samples can be noted in relation to those that expressed their preference for exclusively online educational activities, almost one quarter of students (24.6 percent), but only 5 percent of teachers. However, the pandemic reality in the next academic year, 2021-2022, enabled TUCN to begin the new academic year in a hybrid regime, both in Cluj-Napoca and at university's extensions, with online lectures and face-to-face practical activities (laboratories, seminars and projects). This hybrid system was in place in TUCN until March 2022, when after almost two years in state of alert due to the pandemic, Romania ended the state of alert and started lifting pandemic restrictions. Since then, TUCN switched back to a completely onsite system, with all educational activities taking place face-to-face.

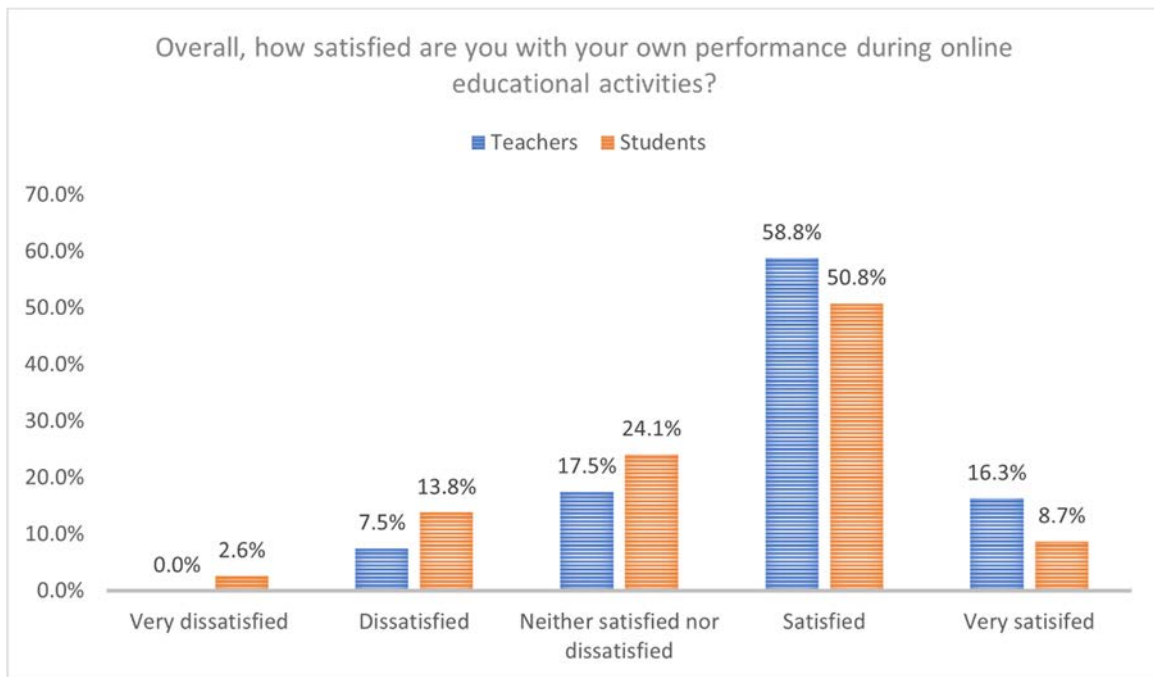


Figure 4. Satisfaction with own performance during online educational activities

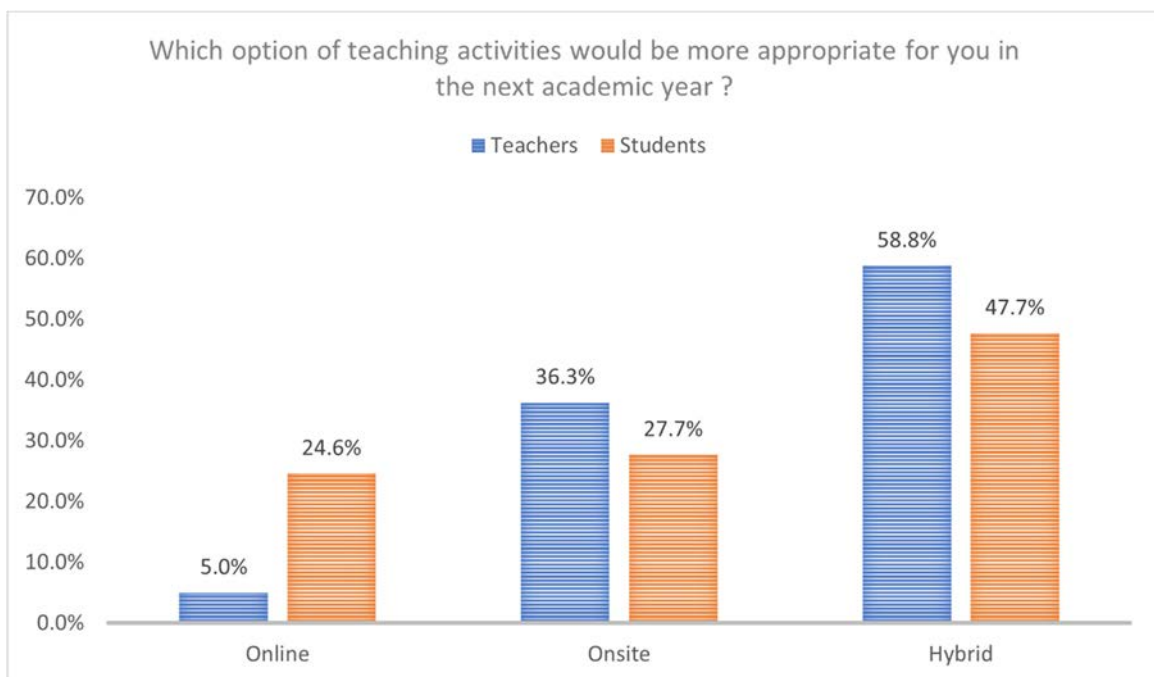


Figure 5. Preference for educational activities in the 2021-2022 academic year

Both teachers and students were also asked about the advantages and disadvantages of online educational activities. For teachers, the most important benefit of online teaching consists in the flexibility it gives for participants to connect from everywhere, according to 88.8 percent of teachers. Other important advantages, from teachers' point of view, consist in eliminating the need for teachers to commute between Cluj-Napoca and Bistrița, an advantage mentioned by almost half of teachers and which is completely expected, as most of the teachers that teach at Bistrița extension have to commute between the two cities, which are 120 kilometers apart. The ease of use of online applications and the large range of applications also represent advantages of online teaching for teachers. Flexibility is the most significant advantage of online teaching for 93.3 percent of students as well. Another important advantage in students' opinion was the possibility of having online exams, an opinion that was shared

by almost 70 percent of students and includes even the fact that almost 15 percent of students considered online exams had a reduced difficulty compared to the classic face-to-face ones. The large range of applications that can be used for online teaching and learning, as well as the easiness of using these applications, are advantages identified by 41 percent and 37.4 percent respectively of students as well.

On the other hand, teachers' perspective on the disadvantages of online educational activities pointed out that the two most important shortcomings of this education system are reduced interaction with students, an opinion shared by 77.5 percent of teachers and students' low motivation level (68.7 percent of teachers). Lower shares of the teachers' sample indicated other disadvantages, such as reduced interaction with work colleagues (36.3 percent), weak Internet connection (30 percent) and the fact that some of the students did not turn on their camera during online teaching activities. In their turn, for students the most important shortcoming of online teaching was the reduced interaction with their colleagues (according to 60.5 percent of students), followed by a weak Internet connection (50.8 percent), low focus capacity (46.2 percent) and reduced interaction with their teachers (45.1 percent). Students also perceived a lack of motivation for educational activities (one third of the students) and felt they had a higher volume of homework to do in the online environment (29.2 percent).

Discussion and conclusions

Education at all levels has been one of the most affected areas after the emergence of the COVID-19 pandemic. Teachers and students worldwide were suddenly confronted with unprecedented challenges for continuing their educational activities.

This paper presented the results of a research carried out at Bistrița extension of the Technical University of Cluj-Napoca, Romania, providing a dual perspective, of both teachers and students, on the educational activities that had to be organized and implemented in the online environment, as a consequence of the pandemic. The obtained results expressed the opinions of almost half of students of the university extension and of 64% of all the teachers that carried out educational activities at Bistrița extension in the 2020-2021 academic year.

The results showed that teachers were less satisfied than students with their overall experience related to online educational activities in the pandemic context, but had a slightly higher degree of satisfaction with their own performance during online educational activities than students. A gap was noted in the perception of both populations about students' active participation during online classes; half of the teachers perceived that students were not at all active or just a little active during these activities, whereas roughly half of students considered themselves as being active or very active during activities.

The results also showed that a quarter of teachers and only 7.7 percent of students considered that online teaching is more effective than traditional teaching, with only 5 percent of teachers and a quarter of students expressing their preferences for fully online teaching activities in the next academic year. These results suggest that online educational activities represent a suitable method for teaching and learning in technical higher education, but more as a complementary approach to traditional face-to-face education.

Flexibility is seen as the main advantage of online education by both teachers and students, as this system gives them the option to join the educational activities from wherever they are. The second most important advantage for teachers was the fact that online activities made the commute between Cluj-Napoca and Bistrița no longer necessary, the distance between two cities being of 120 kilometers, with no highway connecting the cities. From students' side, the second most important benefit brought by online education resided in the possibility of having online exams, which some of them perceived as being easier than traditional face-to-face evaluations.

In what concerns the main shortcomings of online education, the two most important disadvantages for the investigated teachers were the reduced interaction they were able to have with students and a lower motivation level of students, which made it even harder for teachers to draw and keep students' attention in the online environment. On the other hand, students considered that lack of interaction with their colleagues represented the main disadvantage of online teaching, but they also identified other important disadvantages like a weak Internet connection, which could be explained by the fact that 40 percent of the investigated students lived in rural areas, the existence of various distractions that did not

help them to keep their concentration and attention during online activities and reduced interaction with their teachers.

A similar research was carried out by the authors, the targeted populations being the teachers and students from a faculty of the same university, but located in Cluj-Napoca. The results of this research will be disseminated in other papers and a future path for research could rely in investigating if there are significant differences in the perspectives of teachers and students from the faculty in Cluj-Napoca and those from Bistrița university extension.

The study results can provide TUCN with valuable insight for the post-pandemic reality as well, which could be used at university level to design online and hybrid educational activities better adapted to both teachers' and students' perspectives on teaching and learning in the online environment. This aspect is important as in Romania there currently are legislative initiatives for a possible hybridization of higher education.

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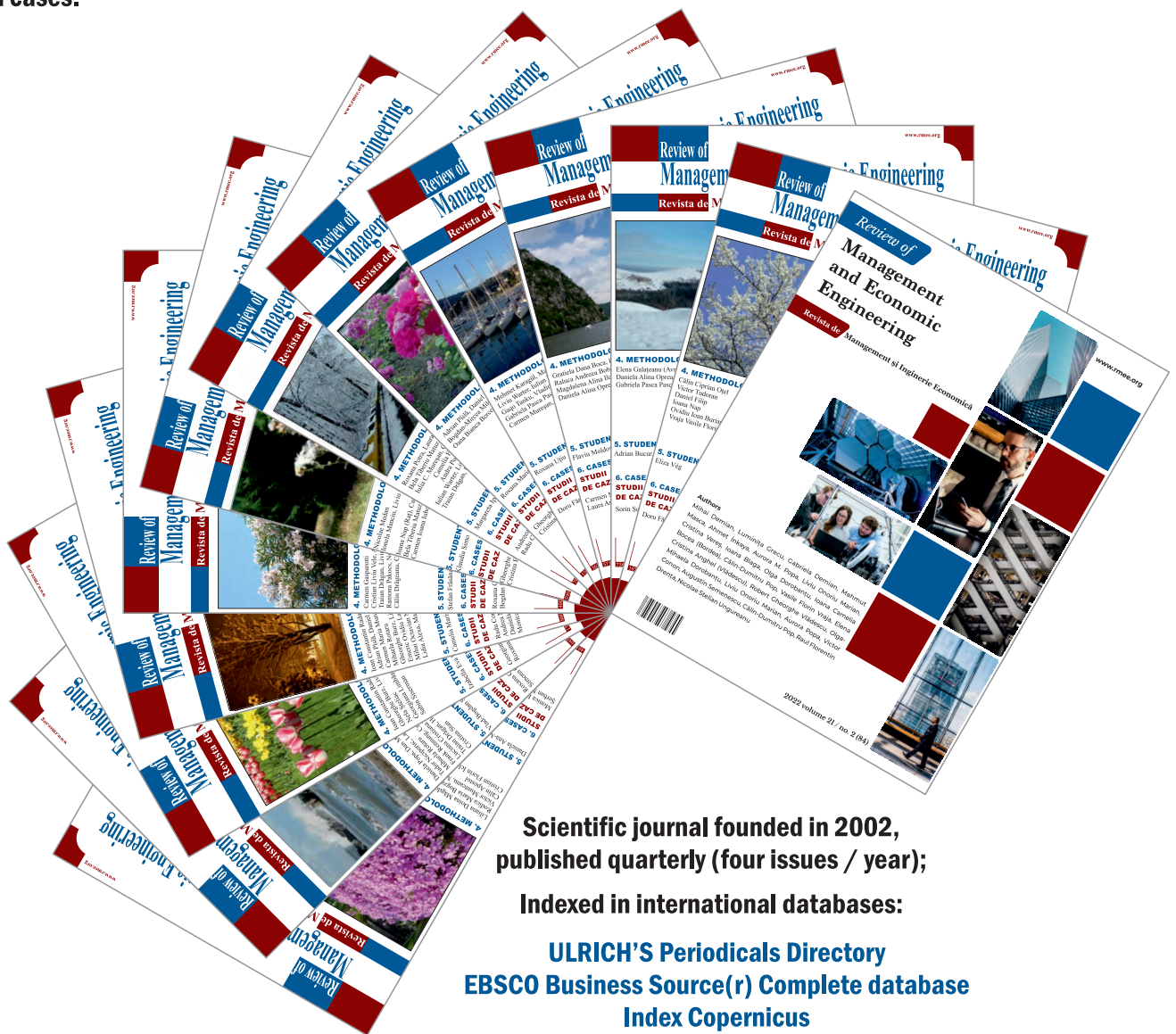
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