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Effect of the basic Corporate Identity factors (organizational culture and strategy) on the competitiveness of SMEs

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Abstract: The Corporate Identity (CI) has influence on operation and success of enterprises, but the literature and case-studies, however, are mostly about large companies. The SMEs have typical characteristic as a special heritage in the ex-socialist countries: the deficiency of entrepreneurial culture and management knowledge. More corporate identity based researches are performed by the author especially for SMEs in Hungary, and secondary data of several competitiveness surveys are analysed. The focus is on the connection of CI synergy, leadership and the company percept success. According to the results the balance of the factors are essential and the organization based competence is undervalued. As new result the main factor is revealed: the GAP and its extend between the leader and the organization has the most significant effect on the competitiveness of SMEs.
The presentation summarizes the results of the researches and gives new approach to the success factors of SMEs.

1 Corporate identity and company success

1.1 Introduction

This paper analyses the success of the Hungarian SME (small and medium-sized enterprises) sector from the aspect of competitiveness, Corporate identity (CI), organizational background and the role of the leader/owner. The author summarizes the organizational specialities of the SMEs based on the literature and case-study. According to these results the conclusion is the corporate identity management characteristically fades into the background of SME operation,

development purposes and strategy. The role of the firm owner-leader is essential in these topics. Meanwhile the unflexibility of the organization, loyalty of the employees, labour market disadvantages, the knowledge level and competency of the human resources, its effect on the efficiency are often the limit of the expansion. These factors have significant influence on the succes and competitiveness of the company. The research results frame an answer to the role of synergic CI in SMEs' success.

1.1.1 Corporate identity and competitiveness

There are several Corporate identity CI models, and usually the source of these theories is the different fields of business science. These models mostly focus on PR or marketing side (reputation, communication, company message, design; [42] [12], organizational side (corporate culture, values, philosophy; [15] [35] [43] [50], or strategy side (vision, goals, management skills). The author uses the CI model of Birkigt, Stadler and Funck ([51] 141.p, Figure 1.) This model summarizes the most important factors of CI, but it is flexibile enough to apply for SME sector.
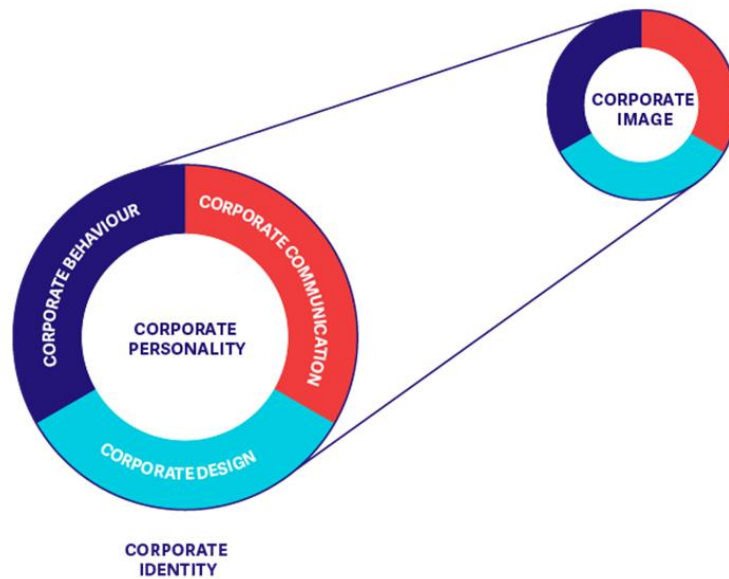
Figure 1 The Corporate Identity model of Birkigt, Stadler and Funck
(in Szeles, 2001., 141.p)

The Corporate personality in the core of the model means the vision, strategy, philosophy and culture of the company. The design, communication and behaviour of the firm should be harmonized with this core, because this balanced connection results synergic CI. Otherwise in the course of time the synergy has

become essential attribute of CI. The synergic corporate identity can ensure competitive edge for companies. According to many authors [7] [8] [9] [39] [42] [51] the synergic CI helps:

- appeal to employees
- recruitment, selection from applicants
- holding and motivation of employees
- cohesion, 'we' sense
- trust and loyalty to the company
- stable and efficient relationship among the employees
- identification of employees

Several researches have proved the synergic CI correlates with higher price level, customer's loyalty and employee's commitment [49] [51] [1] [27] [25]. A synergic corporate identity programme should be based on the centre of corporate identity. According to Szeles it is not necessary to use every part of the model to achieve synergy: the key is the balance and truthfulness. The balanced feature of inside and outside factors and their authentic, congruous information eventuates in the synergic corporate identity.

The Corporate Identity getting an increasingly important factor for companies nowadays. The reason is that Organizational and Corporate Identity has influence on operation and success of enterprises. According to the survey of the MORI research company the corporate identity has become one of the most important role in company success. The survey asked the chairmen of Europe's biggest corporations in 1992 [31]. Based on the results the CI affects recruitment, acquisition, sales, collaborative agreements, share price, etc – actually the part of the company competitiveness. Despite of this emphasized role of CI a lot of CEOs hasn't got any idea how to manage or control it, and their opinion is that it is the one of the biggest management challenge. Olins' opinion is only an A/4 paper is enough to frame the synergic CI [31]. Therefor there are the literature and the CI management professionals with the point that CI is not difficult and only a well-defined corporate core value and synergy is necessary to achieve the advantages of CI management. In the other hand there are the market participant with the experience that CI has a lot of traps in both of creation and management.

1.1.2   SME sector specialities in Hungary

The SMEs usually contribute to the GDP or the total employment to a great extent, but the CI literature and case-studies, however, are mostly about large companies. and they have other special characteristhic too: the lack of entrepreneurial culture and management knowledge is a special heritage in ex-socialist countries [17] [37]. After the change of regime in Hungary the privatisation meant a challenge for employees. After closing the unsuccessful factories there were a lot of recently unemployed people who set up small family businesses and became forced self-employed without any market experience. In

general these entrepreneurs never learnt special economy, they often have 'only' professional knowledge.

„The market worked as the sellers' market even for the „socialist entrepreneurs", therefore real competitiveness could not be developed, the behavioural models and skills which are necessary in a real market economy where the entrepreneurs have to fight against their rivals could not be evolved. … It is the same as putting out the lion from the zoo into the jungle." [17] 580. pp. The authors' opinion is the lack of co-operation in the economy stems from the rootless entrepreneurial culture. During the period of the socialism the distortion of market mechanism had been evolved (and built in the people's values) which had a negative effect on later market behaviour (for eg. envy, low ability to co-operation).

2 Competitiveness at SMEs

2.1 General SME specialities from the aspect of competitiveness

Being leader / owner of a small or medium-sized company is not about only business and profit. Based on Mugler [34] and Hamori-Szabo [17] [18] SMEs usually works in a narrow segment of the market, have smaller market share and often create niche products or services. The owner is the leader – it is typical in Hungary, where the confidence and trust in the business life is a very important factor. The owner has informal and strong relationship with the employees, which comes from the size of the firm (according to the EU definition an SME can have maximum 250 employees). The B2B relationships are more important for SMEs, not only because of the success, but for loyalty, risk avoidance or reduction, trust and the main source of organization competence development [52] [53] [23].

The business leaders do not have the knowledge of economics, information technology, organization, and listen to their instincts in their work [48]. The owner's personal vision often drives the strategy and the future plans of the company. The owner's personality has influence on other part of the operation too: the corporate culture usually based on the owner's attitude and value system. The profit is not the only one purpose of an SME, usually there is other basic goals of the company. For a small or medium company the success can mean efficiency, retain their leadership in the market, keep the good employees or business partners, innovation, etc. „According to several analyses, small companies and family businesses target not only the profit and expansion but other subjective hardly operational aims as well, as the sustainable existence of the company, self-supporting, the „enjoyment" of operation at the firm, or the

independent lifestyle" [37] 3.pp. The family businesses and SMEs have a common set: the family business is a company whose development and operation is affected by the family – the members, the targets or the rules of the family [28].

According to the definition of the European Union a firm is family business, if [28] 380.pp.:

- the decision/ authority/power is at the members or heirs of the family who established the company, or who bought the original capital of the company
- the family wields the company directly or indirectly
- minimum one member of the family or the relationship formally takes part in leading the company.

The limits are the other important specialities of being SME: they usually work with underplaned organization (both of size and competence), reach lower level of knowledge in the labour market, means limited perspective for job seekers. The structure of the organization doesn't contains many levels, therefor an SME can offer poorer carrier opportunities for the employees. To compensate this disadvantage an SME leader needs HR knowledge, but unfortunately it is not achievable for every owner. Certainly every limit can means advantage too: an SME is a familiar workplace, when eligibility is more important than the CV or the former degrees of employees. An SME can be real flexibile both in the organization and the market, and the fast information flow results in efficiency of the firm or responsibility of the individual employees. The limit of the growth is often the owner: an average Hungarian SME leader wants to control every part of the operation (because of trust and lack of knowledge in delegation), but this practice has its own barrier. Usually it is based on the owner's personal purpose and (HR) competence. According to Hamori and Szabo the biggest limit of the talent management is the leader at an SME [18]. The owners have the most important influence on both of inside and outside part of the B2B relationships and decision making process [23]. The companies with „strong" corporate culture are usually more successful [21], and creation company culture is the privilege of the owner at an SME [12] [28] [33] [44]. The owner's behaviour can support the creativity and innovation at the firm, which is one important source of success [2] [3] [41], and the personal motivation of the leader is essential in the vision, future and strategy of the company [4] [13] [19] [37].

2.2   Definition of competitiveness

What is competitiveness? If we can see the originally used resource-based definitions of competitiveness, the following words are available: added value, success of business relationship, market share, development, efficiency, competence, growth, profit, output, innovation, resource optimalization, revenues, utilization, business plan, company size, competitive edge, distinctive factors,

brand value and equity, reputation index, number of customers, performance, rate of return, price-earnings ratio, earning per share…[22]. But these data are based on the past, are about only measurable information of the firm and are not able to inform us about the future of the company. These definitions of competitiveness don't contain the context and environmental opportunities and threats, the organizational knowledge, flexibility of the firm, capability, ability for innovation (especially organization or marketing innovation, which are the most available for SMEs). The process routine, adaptation of new processes or handling the changes show more about the future of the company. Therefor the soft factors of the success and the perception of it is used in this survey and essay as the defintion of competitiveness. This approach is supported by the original competitiveness researchers too: from the data-based aspect the literature moved to the soft factors [22] [37]. The same process is current at innovation theories: the soft factors (especially the organizational side of innovation and competition edge at SMEs) became more important part of the success [24]. The representative and biggest SME competitiveness survey of Hungarian SME sector is the GEM (Global Entrepreneurship Monitor), which is a global competitiveness survey in 76 contries [38] and contains many questions focused on perception of the success, not only business data.

3 Research method and results

Even the Corporate Identity has influence on operation and success of enterprises, but the literature and case-studies, however, are mostly about large companies. Several organizational and corporate identity surveys were performed and secondary data of competitiveness surveys are analysed by the author especially for SMEs in Hungary, also touched upon the specialities of the environment and conditions resulting from small and medium size.

3.1   Pilot survey

The first own pilot survey analysed only two sectors (IT sector and building industry). The reason of cluster sampling is that a homogeneous sample is necessary to reveal the real corporate identity factors. With a heterogeneous sample the results would have shown several influence and not the clear CI background. The two sectors was important to recognise and separate the sector affect. 50 + 50 SMEs were chosen accidentally from a professional market address list (database of professional exhibitions) and analysed from both of the IT sector and building industry. Te research method was interviews with the leaders to measure the synergy of the CI factors. According to the evaluation the leaders of SMEs and family businesses formed their organizational and corporate identity

spontaneously, and the history of the firms outlines typical Corporate identity milestones in life cycle. The owner's attitude has an important effect on corporate culture, strategy and philosophy, the same as the synergy of CI. The balance of the factors are essential and the organization based competence is undervalued. As new result the main factor is revealed: the GAP and its extend between the leader and the organization has the most significant effect on the competitiveness of SMEs.

3.2   Quantitative research period – secondary database evaluation

This part of the research was the analysis of a secondary database from an international research, the Global Competitiveness Project (GCP) [22]. The database contains more query sessions, summ. 995 Hungarian SMEs (representative sample). The basic approach of this survey is that competitiveness is linked to the development of a competitive advantage. It is often conceptualized as the capacity of the organization to efficiently integrates its resources and capabilities seeking to create value-adding competencies. In this research the conceptual model contains 56 individual variables and the competitiveness index is formed by 10 pillars that incorporates system dynamics. The original focus of the survey is to reveal how the proposed index functions in the leader's decision-making purposes. According to the results the weakest pillar is the Human resources, and the most successful firms have balanced pillar performance. So not a few prominent pillar rate means successful firm, but the synergy. The most competitive firms have stronger Human factor pillar and focus on the knowledge development.

The database is submitted for the author and is evaluated in light of own viewpoints, especially focused on the perception of success, decision making, information flow, HR, innovation and future perspective opinions. Because of the different question structure only correlation analysis was available, but the results showed strong correlation among the leader's intention and the success perception. The limit of the success is the well-defined strategy, take notice of the employees in decision making process, ability to plan the changes (resources, deadlines, targets, project management, information flow). A suggestive result that the companies without any strategy often overevaulate their own knowledge and competence in finance, business ideas, organization and HR competence. These leaders think that they have the most of the necessary abilities for successful firm operation, but the circumstances cause problems for the company. When a company (and leader) has strategy or only a strong vision about the firm's future, they tend to value their own abilities in more rational way and based on their own performance. Strategy helps to focus on the real advantages and strenght of the firm, and gives the chance to make grounded decision making process with cooperation and more efficient information sharing. The leaderstyle can be

autocratic at the successful companies too, just the envolvement, trust and HR focus are the essential factors.

The ad hoc management gives the feeling of flexibility for the owners, but without a strong engagement and responsibility about the future of the firm. This management without strategy often correlates with autocratic leaderstyle, one-man decision making process and limited information sharing in the organization, which has strong influence on the loyalty, motivation and creativity (it is the source of innovation and success) of the employees.

3.3   Qualitative research period - organization audit

The second part of the research was a qualitative part with case-studies, interviews, complex corporate audits. According to the stratified sampling only SMEs from Hungary were choosen for the research, and the limits were: the owner lead the firm, the organization mean min. 10 employees. The The basis of the method was the whole organization. The average competitiveness researches ask several difficult questions about the resources and profit results of the firm, and this method determinates that the leader or manager has to be the target person of the survey, because only they have got the required knowledge to answer the particulared questions. Analysis a firm with only asking the leaders is not able to reveal the background of the GAP between the leaders and the organization. This GAP seemed to be an important factos of corporate culture, synergic CI and the success of the company, therefor only a complex organization audit can explain the reason of the company success.

The sample was all SME with real organization (above 10 employees), finally 17 firms were participants of the audit. Important criteria was the owner has to lead the company. The research method ensured the organization based results: the employees were selected from different groups in order to avoid the group-culture and to get real organization culture. This wide range of employee selection helped to reveal the real GAPs between the leader and the organization or the strength and threats of processes, change management, perception of success. The mixed method [40] seemed to the right choice with interviews and questionnaires. The quantitative session of this research part is not detailed because of the limits of this essay. The structure of the research was:

3.3.1   Milestones, basic values

According to the results the leaders tend to evaluate their firm by the output, performance and their most important value were the quality and the customers.

The family businesses have stronger connection to the reputation, loyalty, and the leaders often use their own family name as company name/brand. The employees think of the organization or the place where they have to work. The economic aspect of loyalty was stronger at them.

3.3.2   Strategy, vision

At strategy there was the biggest GAP between the leaders and the employees. The leaders think they create clear strategy and communicate it unequivocally fot the whole team, but employees often feel information asymmetry. The employees' opinion usually is the information sharing is often based on the position, the relationship with the boss and not the real demands. It was especially valid at family businesses, where the family members always know more than the professionals. But trust is able to compensate the lack of information: „I don't know the tartgets of the firm, but I'm sure it is in the head of the owner, so I always do my task" – as an employee explained it.

3.3.3   Identity, image and culture

The firms with strong company culture and identity have more engaged employees and it has the business advantage too (overtime, flexibility, creativity). The leaders who established their firm with a strong and clear vision and value-set are able to achieve their goals and have more successful company – have more efficient processes and changes, more engaged organization and customers, more optimist expectations about their future. The well-managed identity has an other consequent: one of the companies has synergic CI and a leader with clear vision and strategy, it was an absolutely successful company based on the leader's opinion and the financial data. But the employees talked about bad organization culture, moral crisis. The image (outside judgement of the firm) is real positive, and it is enough to appeal the best employees from labour market and keep them. „To tell you the truth it is a horrible firm… but I'm proud of our products, and everybody envies me because I work here. Eventually it is not so bad" – as one of the employees summarized her motivation.

3.3.4   Team, leadership and cooperation

The leaders usually think that they are focus on the team members, not value only the performance, but the employees feel it a bit more rational and economic. The employees felt they haven't got any influence on the leaderstyle and there is no chance for real bilateral cooperation with the boss. The leaders of successful firms egg the employees to give feedback about the processes or their own leaderstyle. Unsuccessful companies usually have one-man management without any feedback, and have bigger GAP between the leader and the organization. The

employees seem to need not the perfect leader: they prefer the authentic and self-consistent behaviour, chance for mistakes, honest atmosphere.

3.3.5 Processes

The flexibility can mean more successful company, but the over-documentation can kill this ability of the firm. The key is the finding the balance between the well-documented and organized processes and the chance to change them. The bigger GAP between the leader and the organization caused unflexibility. The reason is the lack of information sharing, motivation of the employees and the trust. Leaders of successful companies usually created organization-based decision making process: they tend to make the decisions alone, but they lean on the opinion of the employees. The successful companies often check the processes and develop them and use the professional knowledge of the organization to do it. The unsuccessful firms usually don't have enough information about their own processes and often develop them not even failure.

3.3.6 Management of changes

The survey measured three part of changes: the target, the cost and the resources sides. The leaders miss the achieved goals especially, and the cost was the second important problem. The leaders usually have more optimistic opinion about changes. Unsuccessful company leaders often complain of the lack of employee motivation. The employees feel it more stressfull because of the overtime, and they miss the inaccurate planing process, collaboration in the preparation session, and the lack of trust from the leaders. The clear information flow, trust and the behaviour of the leaders can help very much to accept the problems of changes.

3.3.7 Development, innovation

Mostly there is not development or carrier plan for the employees at SMEs. The leaders of successful companies tend to develop themselves too, which is not characteristic at unsuccessful firm leaders. The owners focus on the basic development and skills, and are afraid the employees will leave the company and use the knowledge at other firms. The employees feel they are not important enough and this lack of trust causes a stagnated level of organization knowledge. The soft competence is fixed too, but customers often expect soft skills rather than exact results. „I realised that our business partner wants to kick us from an important project. The reason was that our IT knowledge judged perfect, but they feel our colleagues were not able to handle the tasks. I was surprised, we have great developers… but after this critic we organized project management and negotation training for the IT team if it seems to be more important for the customers" – leader of IT firm.

Conclusions

It is important to frame the MNC (multinational company) based Corporate Identity literature to the SME sector because of its own specialities. As we can see from cited CI literature the corporate identity can interpret only the inside values of the company, which is the concentration of organisational identity and its source, the corporate culture. The interaction of culture with employees, other companies and the society makes a synergy and it has influence on success and competitiveness.

The competitiveness literature has already recognise the SME specialities and the soft factors' essential role in success. Hungarian SME competitiveness research and its database is available and it contains a lot of factor of perception of success and the personalitiy of the leader. The advantage of GEM survey is the representative database, the well-defined research method and the remarkable particulared quastionnare. This last one can mean its limit too, because only one person from a firm is the target person and this participant has to know very difficult data about the company. An SME doesn't equal only with the leader or the manager of the firm, therefor it is not enough to ask only them about the company.

According to the own research results there is GAP in the companies. Its source is the special heritage of the Hungarian entrepreneur culture, cooperation skills and lack of the experience in competition. Family business literature and researches analysed the background of generation change at the Hungarian family business sector among other things [29] [30], and their opinion is the new generation usually is well-educated, they have the economic knowledge to manage a firm, but they don't get the necessary range from the first generation, and they tend to follow the perceptived management practice (which is observed earlier), not the learnt methods. According to the results the sucessful companies have smaller GAP between the leader and the organization, the trust is essential and not the best and innovative firm is the more successful one. The perception is important: there are financially successful and efficient firms, where the leader and the employees have perception of stressful environment and bad mood, corporate culture [44]. When the processes don't work well, there is not trustful information flow and sharing, the decision making process is an one-man show of the owner and the changes are unsuccessful – it is an unsuccessful company in the level of perception for the organization members. And there are small firms with clear strategy, consquent future vision, operation plan and limited sources, where the leader and the employees work together gladly and they feel the firm successful despite of the slow expansion and modest financial results.

Perception and strategy can increase or decrise the financial data of the firm, and corporate culture can be very supportive in this purpose. The conclusion of the researches is the Corporate Identity factors are apparently important in company success as the same the soft part of competitiveness models. Certainly the

researches have limits, for eg. the small sample and the lack of universalization, which is obvious affect of the mixed research method. There are other special factors (with strong influence on CI) at the companies as well, for example the gazelle companies (characterized by rapid growth) facing difficulty in corporate identity management, and it is an ambitious goal to ensure its synergy, but it is not a part of this survey.

Acknowledgement

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Industrial revolution 4.0, renewable energy: A content analysis

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Abstract: The aim of this paper is to demonstrate the applicability and value of qualitative research methods (i.e. Content analysis) in the scientific fields. The sample was collected in light of the fourth industrial revolution and renewable energy papers publish in the first half of 2018. a combination of qualitative and quantitative methods were applied. Our results shed light on potential applications of such analytical techniques in natural science. In our specific sample, we were able to identify the major drivers of research in the field of renewable energy given the advances of fourth industrial revolution.

Keywords: Qualitative Content Analysis, Fourth Industrial Revolution, Renewable Energy, C-Coefficient, Pearson's correlation

1 Introduction

Mayring (2000) defined Qualitative Content Analysis (QCA) as a family of systematic, rule-guided techniques used to analyze the informational contents of textual data. Different methods have been developed within the context of content analysis, which includes both qualitative and quantitative methods, with both sharing the central feature of systematically categorizing textual input data to generate sense out of the qualitative as well as the quantitative generated components of the data under analysis (Forman and Damschroder 2007).

Content analysis is currently an established method that also may be used to gain insight into natural sciences fields. In the field of sustainability, major economies around the globe are currently emphasizing technological development on renewable energy sustainability over the currently used finite conventional fossil fuels. This prospect has recently started expansion to third world countries such as Jordan (Al Shafeey and Harb 2018), where energy resources are scarce, with the push of energy cost mitigation as the main adoption driver together with the global contribution to reducing environmental impact of fossil fuels (Gross, Leach et al. 2003, Boyle 2004). Further, Content analysis has been used previously to advance the understanding of agricultural sustainability by (Velten et al., 2015).

Industry in general plays a major role in economic development and growth as with every industrial leap, material goods get mechanized and automated to a further dimension of applicability. The "Industrial Revolution" as a term is utilized to refer to specific high impact technological developments which lead to paradigm shifts in all aspects of human civilization. The first industrial revolution was triggered by the technological discoveries in the field of mechanization, followed by the intensive use of electrical energy, which is referred to as the second industrial revolution. The third and fourth industrial revolutions are both linked to Digitalization but on two very different levels (Lasi, Fettke et al. 2014).

The third industrial revolution is related to increased accessibility and widespread of digitalization, while the fourth industrial revolution is rather related to the combination of internet technologies and smart objects, where machines and products can interact with each other through sensors coupled with Artificial Indigence (AI) algorithms, to produce more targeted products through an autonomous control system. The resulting interaction is the newest paradigm shift to date and its currently on the rise. Furthermore, Given the sub advances that are expected in the current industrial revolution; the term "Industry 4.0" was established to mimic software versioning nomenclature (Lasi, Fettke et al. 2014).The term was first used in 2011, and is defined as the collective technologies of a value chain creating a unified cyber-physical system (CPS); Internet of Things, Internet of Services (IoT, IoS); Internet of People (IoP); and Internet of Energy (IoE) (Lom, Pribyl et al. 2016).

Currently, both fields of industrial revolution and renewable energy are considered hot topics. In this work we will be exploring the potential and applicability of qualitative research methods (i.e. QCA) in the scientific fields. As an example, we will be using renewable energy as our main theme and we will be investigating the relationship between renewable energy and the fourth Industrial revolution using a combination of qualitative and quantitative methods. Our results will shed some light on the potential uses of such analytical techniques in natural science. Different statistical software analysis tools in conjunction with textual analysis tools were utilized to identify the level of correlation between extracted codes finally leading to generating a level array. In the following sections, the

methodological approaches adopted will be detailed, results summarized and further discussed and ultimately concluded.

2 Methodology

Content analysis in natural sciences is the major theme of our work. As an example, we will be investigating the relationship of "industrial revolutions 4.0" published articles, which referred to "renewable energy" in their context. The methodology utilized for this work is a combination method of qualitative and quantitative analysis.

To gather data for the work, the researchers obtained and analyzed the studies published during the first half of 2018. ScienceDirect was chosen as a database for our search, given its multidisciplinary publishing nature. The term "Industrial Revolution 4.0" was set to be the main search term. In addition, "renewable energy" term was conjunctly used to look in the "title, abstract or keywords field". The search engine was set to look only for "research papers". Fourteen papers in total were obtained, of which four papers were agreed upon by the authors for exclusion. Ten articles were finally selected and analyzed. These papers are summarized in Table 1. Exclusion of papers was based on either irrelevance or out of date range. For instance, articles published before January, 2017 and after June, 2018 were excluded. also, articles irrelevant to our specified field of study were further eliminated. After careful assessment of the papers by all the researchers, articles which did not meet our selection criteria were excluded.

For the analysis part, qualitative tools were used to obtain word frequencies and generate our codes deductively. Codes were generated by "Atlas.Ti" software, Later; the resulting data from Atlas.Ti was migrated to SPSS in order to perform the statistical quantitative tests required for our work such as occurrence, co-coefficient relation, and Pearson's correlation.

3 Results

Table 1 shows the articles selected after applying the search criteria for the analysis. The papers were retrieved, converted into text documents and then imported to ATLAS.ti software. the coding process started with condensation of the transcribed text to finally generate 17 codes. Table 2 shows our generated codes and their frequency. C-Coefficient was then used to indicate the strength of the relation between each two codes and the generated values were then exported

to SPSS software to conduct further statistical analysis. In SPSS, Pearson's correlation was used to identify the relationship linearity between each two codes.

Table 1. Selected research papers and their corresponding authors.

No.	Title	Author/s
1	A Pathway Towards Sustainable Manufacturing for Mid-size Manufacturers	Jun-Ki Choi, Ryan Schuessler, Michael Ising, Daniel Kelley, Kelly Kissock
2	Agent-Based Simulation Model of Virtual Power Plants for greener Manufacturing	Stefan Woltmann, Maximilian Zarte, Julia Kittel, Agnes Pechmann
3	An IoT based approach for energy flexible control of production systems	Julia Schulz, Richard S.-H. Popp, Valerie M. Scharmer, Michael F. Zaeh
4	China's energy revolution strategy into 2030	Qilin Liu, Qi Lei, Huiming Xu, Jiahai Yuan
5	Comparative analysis for solar energy based learning factory: Case Study for TU Braunschweig and BITS Pilani, Procedia CIRP	Kuldip Singh Sangwan, Christoph Herrmann, Manoj S. Soni, Sanjeev Jakhar, Gerrit Posselt, Nitesh Sihag, Vikrant Bhakar
6	Energy modeling approach to the global energy-mineral nexus: Exploring metal requirements and the well-below 2 °C target with 100 percent renewable energy	Koji Tokimatsu, Mikael Hook, Benjamin McLellan, Henrik Wachtmeister, Shinsuke Murakami, Rieko Yasuoka, Masahiro Nishio
7	Financing renewable energy: Who is financing what and why it matters	Mariana Mazzucato, Gregor Semieniuk
8	Population growth, urbanization, and electricity - Challenges and initiatives in the state of Punjab, India	Ritu Raj Kaur, Ashwani Luthra
9	The achievement of the carbon emissions peak in China: The role of energy consumption structure optimization	Shiwei Yu, Shuhong Zheng, Xia Li
10	The role that battery and water storage play in Saudi Arabia's transition to an integrated 100% renewable energy power system	Upeksha Caldera, Christian Breyer

Table 2. ATLAS.ti generated codes and their corresponding frequencies

Climate	Coal	Development	Electricity	Emissions	Energy	Energy Demand	Finance	Gas	Industry	IoT	Manufacturing	Peak	Photovoltaics	policies	storage systems	sustainability	Total
49	77	122	198	185	792	4	134	119	43	22	82	119	145	38	134	44	2307

3.1 C-Coefficient

The C-Coefficient was used to indicate the strength of the relationship between codes (Smit, 2012). C-Coefficient can take any value between zero and one; zero means codes do not co-occur, and one indicates that these two codes co-occur wherever they are used. The closer the C-Coefficient to one, the stronger relation is. (Lewis, 2016) The C-Coefficient was calculated using the equation (1) which was simulated through ATLAS.ti. Where $n12$ is the co-occurrence frequency between the two codes $c1$ and $c2$, whereby $n1$ and $n2$ are their occurrence frequency. Results are shown in Table 3.

$$C = \frac{n12}{n1+n2} - n12 \tag{1}$$

The results show that the highest C-Coefficient was between "emissions" and "peak" codes with a value of 0.8. That indicates that "emissions" were discussed as "peak emissions" most of the time. The result indicates the direction of the studied population was to study the "peak emissions" as an important part of studying emissions.

Other high C-Coefficient values were seen between the codes "sustainability" and "development", "energy" and "emissions", "electricity" and "development", "manufacturing" and "development". Table 3 shows C-Coefficient results for the mentioned codes. The results of the C-Coefficient analysis show that some aspects of fourth industrial revolution like sustainability and development (Stock and Seliger, 2016) were related. While other aspects were not significantly related.

Table 3. C-Coefficient values between the selected codes generated by ATLAS.ti

	Energy	Electricity	emissions	Development	peak	Manufacturing	sustainability
Energy		144 - 0.17	246 - 0.34	119 - 0.15	38 - 0.04	126 - 0.17	48 - 0.06
Electricity	144 - 0.17		49 - 0.15	60 - 0.23	19 - 0.06	12 - 0.04	6 - 0.03
emissions	246 - 0.34	49 - 0.15		23 - 0.08	135 - 0.80	32 - 0.14	17 - 0.08
Development	119 - 0.15	60 - 0.23	23 - 0.08		7 - 0.03	53 - 0.35	39 - 0.31
peak	38 - 0.04	19 - 0.06	135 - 0.80	7 - 0.03		3 - 0.02	1 - 0.01
Manufacturing	126 - 0.17	12 - 0.04	32 - 0.14	53 - 0.35	3 - 0.02		90 - 2.50
sustainability	48 - 0.06	6 - 0.03	17 - 0.08	39 - 0.31	1 - 0.01	90 - 2.50	

The C-Coefficient table shows the relation between two codes; however, it doesn't show the strength of a linear relationship between paired data (a whole column and a raw). furthermore, the C-Coefficient tables doesn't provide enough information about the relation between "industrial revolution 4.0" and "renewable energy". Each code in this research have seventeen C-Coefficient values indicating the relation between each code and the other sixteen codes. Thereby, a further investigation can be done and the linear relationships between two sets of

data can be analysed. Accordingly, Pearson's correlation coefficient was used to find the relations between these sets of codes (Sedgwick, 2012).

3.2   Pearson's Correlation

Pearson's correlation coefficient is a statistical measure of the strength of a linear relationship between paired data, it is symbolized by r and is by design constrained in value between 1 and -1. the closer the value is to 1 or –1, the stronger the linear correlation.

$$-1 \geq r \geq 1 \tag{2}$$

To put Pearson's correlation into categories, (Evans, 1996) suggested a categorization system for the absolute value of r: 0.00-.19 "very weak", 0.20-.39 "weak", 0.40-.59 "moderate", 0.60-.79 "strong", .80-1.0 "very strong".

Pearson's correlation was applied to the previously obtained C-Coefficient values from ATLAS.ti. It was calculated for each set of codes in order to identify the correlation direction and strength of the relations between sets of codes. The results show that most of the r values were positive, some sets show very strong linear relations, other sets varied between "strong" to "very weak". Here in this study, the "very strong" linear relation was a main focus. The Pearson's correlation analysis shows that the "energy" and "peak" sets of data and "industry" and "sustainability" sets of data both has a very strong linear correlation as can be seen from Pearson's results in table 4.

It was observed that "energy" and "peak" shows a very strong linear relation, while table 3 above shows an insignificant C-Coefficient between the two codes. Pearson's correlation shows the strength of a linear relationship between paired data. Here the .803 r value shows a very strong linear relation between "energy" and "peak", which means whenever authors in this research's population were discussing "peak" regarding the other sixteen codes, "energy" was discussed as well regarding to the other sixteen codes. In other words, the more "energy" was discussed is the more "peak" was discussed too.

Table 4. Pearson's Correlation results

Code	Energy	Peak	Code	Industry	sustainability
Energy	1	.803**	Industry	1	.896**
peak	.803**	1	sustainability	.896**	1

**Results are significant. Correlation is significant at the 0.01 level (2-tailed).

The results show that even though "energy" and "peak" was not discussed together many times, yet they are highly related. "energy" and "peak" have strong

linear relation, and the more "energy" was discussed the more "peak" pondered. The same conclusion can be made for the relation between "industry" and "sustainability". Whenever the authors discussed "industry", "sustainability" also was concomitantly discussed with regard to the other sixteen codes. Hence industrial sustainability was one of the major research themes to an extent.

It was found by the Pearson's correlation test that not all the aspects of industrial revolution 4.0 were related to renewable energy. Other aspects of industrial revolution 4.0 such as; Decentralization, Real-Time Capability and Modularity were not mentioned in the selected publications (Lom, Pribyl et al. 2016).

Conclusions

This study was aimed to demonstrate the applicability of content analysis in natural sciences. From our selected paper population, it can be concluded that content analysis can be used for data extraction and analysis. In this study content analysis was used for finding the relations between different aspects of industrial revolution 4.0 and renewable energy. Our results demonstrate how certain fields relate and inter-connect with each other. Further, using our mixed methodology, we were able to quantify the level of correlation between the studied terms. This work can shed light on the degree of inter-connectedness between two specific topics.

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The Risk of Using Biometrics

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Abstract: Biometric is an advanced technique that provides excellent benefits in access privilege and authentication. This security technology has become an integral part of a variety of sectors, regardless of its type, governmental or private. The growth of proprietary data is becoming increasingly important for excellent authentication solutions that enhance mobile security. The security of information is necessary to protect the property of institutions that may fall into the hands of competitors or hackers and cyber-terrorists. This paper shows the hidden risks of biometric techniques and how to avoid them.

Keywords: biometrics, technologies, risk of biometrics

1 Introduction

Biometrics is a science that studies physical and behavioral properties that can distinguish people from each other. The term biometric comes from two Greek words "bio" meaning life and "metric" meaning to measure [1].The application of biometric systems with their simple conditions actually comes from ancient times. Relevant sources have reported that people who lived thousands of years ago identified each other with characteristics that were easily measured, such as eye colour, skin colour, and height [2].

The 19th century scientist Henry Faulds proposed a paper in a "Nature" magazine about fingerprints, it recommended the use of fingerprints as a definition system, including the scientific definition of criminals [3]. Before the 21st century, there were time losses in the military and commercial sectors because of the lack of

automatic recognition. In the early 21st century this problem got acceleration, computer technology included fingerprint recognition sensors on laptops and applied to other intelligent devices [4].

In 1964, scientists Woodrow Bledsoe, Helen Chan, and Charles Bisson began working on face recognition project. This project was called the man-machine, and the face images of people were compared with the technology of that era RAND tablets. The algorithm was designed to measure pupils, eye edges, forehead lines, and 20 parameters such as mouth width, eye width, and pupil distance [5].

Today's technology has reached a stage of maturity that enables us to reveal our identity through fingerprints, voice, iris, or even through our brain print - quickly, simply, safely, without error, and in an inexpensive way [6]. Information plays a vital role in the success of very organizations, the biometric information is like bits any other digital information, modern security industries and individuals looking for biometrics as an ideal solution [7]. However, it can be stolen, altered even held for ransom. It is subject to all data breaches and other offences that may affect bank information or school records. Biometrics become an interesting research area in recent years, the physiological or behavioural characteristic can be used if it has these properties:

- Unique: It must be different from person to person until the twin brothers.
- Universal: It must be universal and not exist in a specific category of people.
- Durable: It should not be affected by age and be permanent.
- Measurable: Must be measurable with simple technical tools.
- Easy to use: It should be easy and convenient to measure.

The community is not clearly understood about the risks of privacy and security in biometrics. Everyone knows that biological traits can be used to identify people. The technology has enabled a large number of new biometric identification systems that use fingerprints, iris scans, wrist veins scanning, voice recognition and facial recognition [8]. However, when it comes to potential invasion of privacy, these different methods are not equal. All biometric systems capture biometric data, enter that data into a database, and capture new data to run against the database looking for a match. They all work well to identify individuals using computer analysis of various body parts. It is difficult to capture most biometric data, it usually requires permission or explicit knowledge to capture fingerprints, iris, vein, and other biometric data [9]. For instance, your bowels or veins may not have been checked once.

2 Selected Biometrics Technologies

Biometric behaviour solutions offer less risk than the huge misuse of physical biometric techniques. Biometric behaviour techniques are currently not widely used and, therefore, will not be discussed in this document. Behavioral biometric information is also much more likely collected without the user's knowledge of the system, and thus may present more legal and Organizational issues of business. This paper covers the basic concept of selected biometric methods for identification and authentication, included:

- Fingerprint
- Facial recognition

There are other Technologies not covered in this paper, included:

- DNA.
- Gait.
- Ear shape.
- Vein patterns.
- Fingernail bed.
- Foot dynamics.
- Retinal matching.
- Skin luminescence.
- Brain wave pattern
- Footprint recognition.
- Facial thermography.

Figure 1. Classification of Biometrics

Technologies (source: [10])

2.1 Fingerprint

Automatic matching of fingerprints is among the oldest biometric techniques. Currently, fingerprint recognition is the most widely used method of biometric authentication and one of the most cost-effective methods. However, there are differences in how to read fingerprints, with some effective reading techniques under the surface of the outer skin, making them more reliable under a variety of operational scenarios. We have seen fingerprint readers integrated into laptops and handheld devices, and this trend is likely to continue, especially in the world of smart phones and Tablet PC. Independent fingerprint readers are manufactured easily and may use a variety of operational techniques and connectivity options [11]. Moreover, there are devices that enable multiple fingerprint collection at the same time. These are of obvious importance to law enforcement and border control agencies. Fingerprint reader is an electronic device that records a digital

fingerprint image. The captured image is known as the direct scan, which is digitally processed. Distinctive features are extracted and a biometric fingerprint template is created. This biometric template is stored and will be used in the matching process later [12].
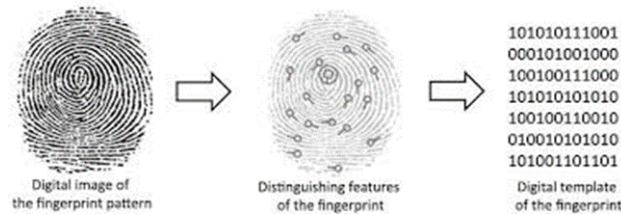
Figure 2. Illustration of fingerprint reader (source: [13])

2.2 Facial recognition

Facial recognition was a revolution in the biometric technology. Especially, in the last 10 years it become a popular topic. Since 2001 September 11, there has been a strong movement to integrate the face Recognition techniques in national security plans [14]. This technology can be used in monitoring activities, it has the ability to access large databases of images obtained during identification processing.

This technology can be considered an easy to implement. Most of the cameras included in laptops and other portable devices are capable, with the right software, of capturing a passable facial image. Face recognition algorithms are varied, like PCA (Principal Component Analysis), ICA (Independent Component Analysis), LDA (Linear Discriminant Analysis), EP (Evolutionary Pursuit), EBGM (Elastic Bunch Graph Matching), Trace Transform Radon, Hidden Markov Model, Eigenfaces Model, Fisher Model, AAM (Active Appearance Model), Artificial Neural Networks, 3D Morphable Model, 3D Face Recognition are frequently used algorithms. Recently, face recognition algorithms have been developed by using machine learning [15].

In 2D facial recognition techniques take recordings with a single camera and convert it to numerical value by using the algorithm that it uses [16]. However, this may even be affected by the user's facial expressions, environmental light and the face. Some algorithms implement the colour and the light normalization, but this process can extend the time for verifying the identity of the user, also increasing false negatives and false positives. Receiving more than one reference face information for a user can also fill the storage area. In addition, 2-dimensional validations can be fooled easily with a passport photo. [17].

In 3D face recognition, optical scanners mapped the surface it scans. Because it requires more than one camera, it increases the cost. On the other hand, colour, light and perspective have no effect in 3D techniques [18]. Because it performs

multiple 2-dimensional analysis, it provides a more accurate authentication than a single two-dimensional image.
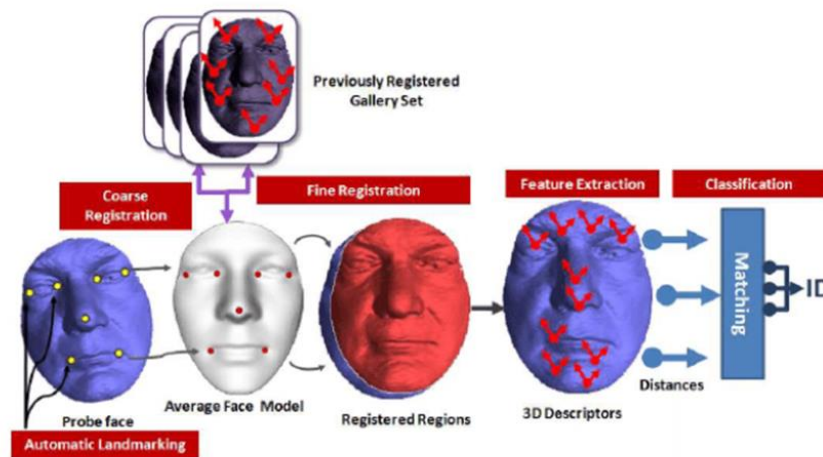
Figure 3. Overall pipeline of a typical 3D face recognition system (source: [19])

The effectiveness of all these systems can be measured. FAR (False Acceptance Rate) is the rate of false detections caused by the system's mapping of information to a person who is not present in the database and matching it to another person in the database. False Rejection Rate (FRR) is the rate at which the system cannot find the existing person in the database [20]. The smaller the FAR and FRR values, the closer the system is to the ideal. There is an inverse ratio between FAR and FRR. Where the FAR and FRR are equal or (the area under which the FAR and FRR curves are equal) is called EER (Equal Error Rate). The lower the EER value, the better the system [21].
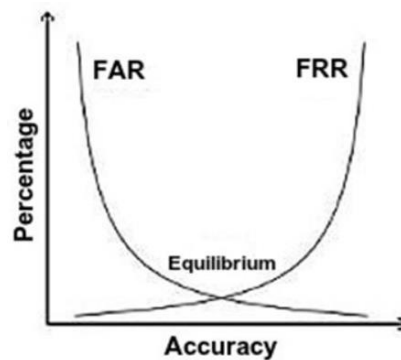
Figure 4. FAR and FRR equilibrium (source: [22])

3 Risk Factors Associated with Biometric Identification

Most of the biometrics systems store the user's data without any encryption or hashing in order to be able to access them quickly. Furthermore, those systems can be rendered ineffective due to problems caused by it, or by intentional attacks, such as a product with a high FAR due to the poor quality of the parts used can verify the wrong person or a manipulation to the sensor or database, can add a person who should not be verified. At the same time, a data of a user previously registered to the system may be copied and presented to the system in different ways. Like using the passport-size photograph of the person in 2-dimensional face recognition.

Due to problems with the Face ID technology of new iPhone devices, there have been instances where the phone can be opened by children or twins. Where physical access to the device is possible, malicious users may modify the sensor to authenticate it. In the channels that provide communication between the system components, it can be performed covertly, the data can be manipulated by Man-in-the-middle attacks, brute-force attacks can be performed, the captured data can be authenticated using again and also artificial data can be generated for matching [23].
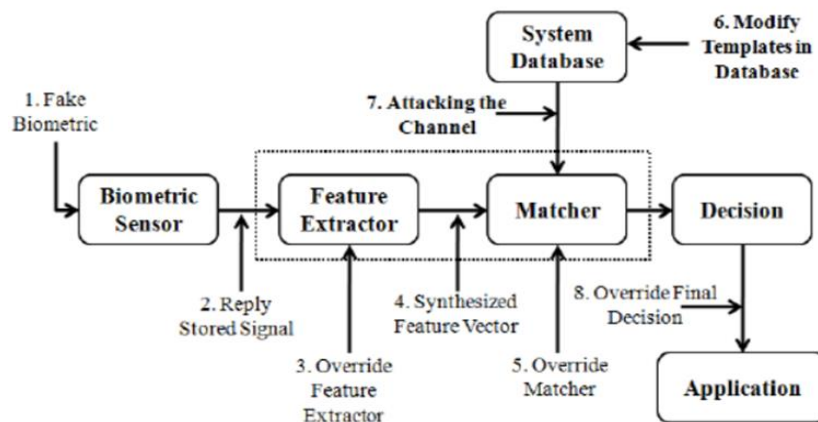
Figure 5 Attacks on Biometric System (source: [24])

In the case of access to the database, the confidentiality and integrity of the data in particular are compromised. Reading unencrypted data can also mean access to personal data. Similarly, the attacker can read the data, access the templates, add his own information, or change data for someone else. By altering the link between identity and biometric, it can lead to an inability to authenticate. If access to decision and matching mechanisms is available, the degree of matching of the entered value can be changed, the previously entered value can be entered again or match results can be tested and brute attack attacks can be carried out. In addition,

biometric identification systems with automatic and unattended registration are always open and misleading identity. Any incorrect information to be entered at the time of registration may result in misuse or may be matched with an accurate biometric, false identification.

Despite these attacks, the first important security measure is to ensure the physical security of the system. At the same time, the information in the database must be stored or encrypted. In order to solve the problems in the channels, it should be preferred that the inter-component traffic flows. Unfortunately, all these features will interfere with the performance of the device (or system). Each encryption processing can extend the time during authentication, even at machine speed. However, such measures should be taken where security and identity certainty are necessary. In addition, it is recommended that biometric verification should be used as a secondary method rather than alone, because of such problems in biometric authentication.

4 Risk Assessment and Reduction Methods

In any technological intelligent systems, the risk assessment is extremely important in order to solve problems. The purpose of the risk assessment is to minimize the potential risks by calculating the probability and severity. In biometric systems, threat sources are adversarial (hackers) and non-adversarial (human errors, structural failures, or natural disasters). It is possible to determine the probability and severity of the potential attacks by considering the result of figure 5.

The risk of the given process should be known correctly to make a reliable decision. In Pokoradi article, a study on fuzzy logic based risk assessment is presented which can be used in the modern complex engineering system. In the article, the author classified the risk possibilities into two categories according to their severity (catastrophic, critical, moderate, and negligible) and probability (frequent, likely, occasional, seldom, unlikely). Table 1 shows the level of risk determination from the article [25].

Table 1. Risk Assessment Matrix

Threat Event Occurs And Results in Adverse Impact	Frequent	Likely	Occasional	Seldom	Unlikely
Catastrophic	Extra High	Extra High	High	High	Medium
Critical	Extra High	High	High	Medium	Low
Moderate	High	Medium	Medium	Low	Low
Negligible	Medium	Low	Low	Low	Low

Many methods can be followed to ensure using biometrics effectively and minimize the risk of using it.

The first method, encrypt templates stored in databases and protect them from attackers. Therefore, digital scales can be used as a key to encrypt data until they are used.

The security and authentication can be performed using the watermark method, which adds some additional information to the security object. This extra bits addition provides security to the source object. On the other hand, the source object also causes some distortion. The watermarking method includes more information to the database (data source, data destination etc.) within the data itself (image, sound etc.) this inclusion may be apparent or invisible. The purpose of using the watermark in biometrics is to confirm the data source plus detection of any change may occur.

The combination of several models, several sensors and multiple biotechnologies such as fingerprints and iris can significantly reduce risks. In addition, the use of more than one biometric image sample will minimize the validation process by doing more calculations.

Conclusions

In this paper, the authors present a brief overview of the hidden risks of biometric techniques, some risk reduction methods and two of the most popular biometric technology fingerprint and face recognition technologies are discussed.

Biometric systems face many security challenges such as system security itself, integrity, and reliability. There is a need for an information security research that addresses the specific problems of biometric systems, such as prevention of attacks based on the provision of false biometrics, reuse of previously captured biometric samples and the development of technologies.

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Implications of the enforcement of the international accounting standards over the financial and economic information of the Spanish companies

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Abstract: Accounting information has to be useful to enable different end-users (mainly investors and shareholders) to make informed decisions. It is for this reason that the analysis through ratios linking the balance sheet and the profit and loss accounts is a key tool for studying the economic and financial situation of companies. As a result, a clear objective of the International Financial Reporting Standards (henceforth IFRS) is to

establish parameters of recognition, measurement, and representation of the financial information that improve the usefulness of these indicators. This paper demonstrates how the process of harmonization of the accounting rules has affected the results of Spanish companies and whether the regulatory changes have influenced the companies' performance. We revisit IFRS accounting principles related to assets and liabilities of the balance sheets (in particular, related to tangible and intangible fixed assets, leases, and financial instruments) in order to ascertain if the changes have an impact on key management accounting ratios, such as capital adequacy ratio, liquidity ratio, debt ratio, return on assets (ROA), or return on equity (ROE). We assess the major implications of the enforcement of international standards on the Spanish accounting system in general, and on management ratios in particular. The main conclusion is that the requirement to use of fair value in financial instruments with mandatory accounting revaluations, caused solvency to move in the same direction as the change in valuation. In addition, the application of the amortized cost for debts improves the company's autonomy by reducing its indebtedness because deferred interest are not considered as debt. Concerning the other assets, the international regulation moves the 'non-current assets held for sale' from non-current assets to current assets, thereby improving the companies' solvency and liquidity. Although there are no significant changes in valuations applied to 'financial lease', because of the principle of 'substance over form', certain contracts that should have been considered as operational (and recorded in the profit and loss account) must now be treated as a 'financial lease', while the non-current asset and short and long term debt are recorded in the accounting. This change in turn worsens the solvency situation. In sum, regulatory change that affects the concept of result and the valuation assumptions based on fair value will have a significant and positive impact on the image of the company, thus improving the ROA and ROE indicators.

Keywords: International Standars;ROA; ROE; liquid; solvency

1 Introduction

The analysis of the financial statements of a company is aimed at assessing its current situation and forecasting its future, so that it is possible to correct the weak points of the company, take advantage of strong points [10], and help economic actors in their resource allocation decisions, such as investment and credit decisions [3].

The analysis of the accounting information helps both internal and external agents associated with the activity. The former will use the analysis to guide their management decisions, while the latter will take it as a basis for taking decisions on the appropriateness of committing resources to the firm. Nevertheless, financial statements are not the only source of information for making judgments; they must be complemented by an analysis of the business environment and strategy. By examining this information, analysts will be able to draw conclusions about the

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company's historical development, as well as extrapolate it into the future to make a valuation.

Garcia Lorenzo et al. [10] distinguish two basic types of analysis: economic analysis and financial analysis. The financial analysis aims to know the financial structure in order to determine the relationship between investment and financing and study the level and quality of indebtedness. This is often referred to as verifying the company's ability to meet its debts. The economic analysis tries to look at the company's results to make judgments in terms of productivity, profitability, performance, margin and profits.

The amount of an account or an asset considered in isolation provides little information on the position of the firm or on the management carried out. It is therefore necessary to implement a methodology to compare the information both with other benchmark companies and with the own data presented by the company in its historical evolution. According to Archel Domench et al. [3], the analysis through ratios transforms accounting information so that it become comparable.

In view of the foregoing, the aims of this work are:

–   Knowing the implications of the application of international accounting standards in Spain, through the adaptation of the Spanish General Accounting Plan (henceforth Spanish GAAP).

–   Reviewing the changes in both the main accounting items and valuation standards as well as the effect of these changes on the main ratios (solvency, liquidity, indebtedness, return on equity, and return on assets), according to the definition of ratios of Amat [2], Aching Guzman [1], Archel Domench et al. [3], and Gonzalez Gomez [12].

This work is structured as follows:

–   After reviewing the legislative developments, section 2.1 presents the changes in annual accounts and their impact on solvency and indebtedness.

–   Sections 2.2 and 2.3 show the changes in fixed assets and intangible assets, together with the concept of fair value and its effect on indebtedness and autonomy.

–   Section 2. 4 details the changes in the profitability of companies resulting from the introduction of the valuation of financial instruments at amortized cost.

- Point 2. 5 reviews the effects on corporate profits induced by changes in the valuation of inventories.

- Sections 2.6 and 2.7 are reserved for two new elements: the valuation of corporate risks in the provisions and the valuation of the events occurring after the end of the financial year.

- Finally, the conclusions underline the idea that including the statement of cash flows and the statement of changes in equity improve the accounting information, because a more complete vision is offered and new risks are reported. Two main ideas stand out with regard to the valuation standards: on the one hand, the valuation of liabilities is more prudent than before, since the financial cost is not included in the company's debt, which implies an improvement in results; on the other hand, when valuing assets there is the possibility of revaluing them since the fair value can be included.

2 Effects on the balance-sheet assets and liabilities arising from applying international regulation

The European Union (EU) has led a process of accounting harmonization that seeks to achieve higher quality in the available financial information and to help investors in decision-making, and all of this to the benefit of achieving markets that operate more efficiently.

As a result of this process, shown in figure 1, the consolidated accounts of listed companies must be drawn up since 1 January in accordance with IAS/IFRS and in the case of the other companies (the non-listed ones), the Spanish regulator decided to modify the GAAP that was passed into law by the Royal Decree 1614/2007.

Figure 1. Process of harmonization of accounting standards in Spain
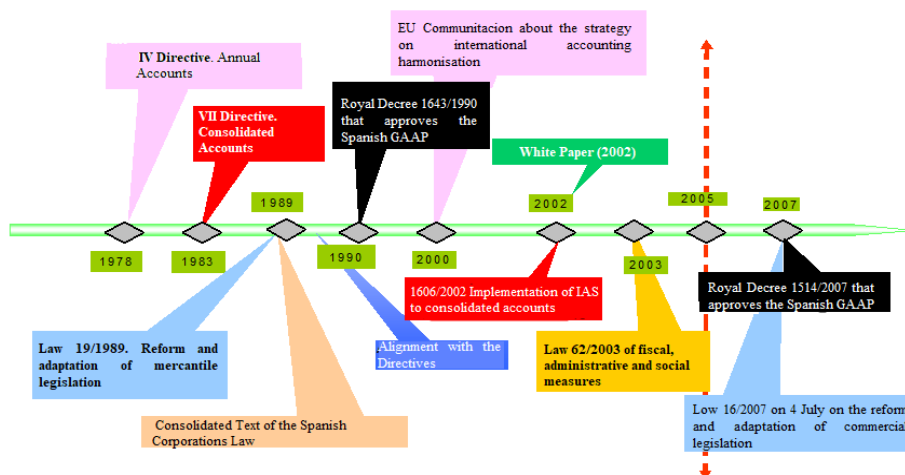
Source: prepared by the authors

1606/2002 Implementation of IAS to consolidated accounts

Law 62/2003 of fiscal, administrative and social measures

Before adapting the international accounting standards, a report was commissioned in 2002 on the situation of the Spanish accounting at that time and the basic lines for tackling its reform (known as the White Paper and published by ICAC Instituto de Contabilidad and Auditoria de Cuentas, 2002) [13]. This document included proposals drawn up by a group of experts to tackle the reform. It also included the recommendation on standardizing the calculation of the ratios, although it has not yet been implemented.

In the following we present a summary list, while not exhaustive, of the main modifications that the GAAP has caused in the balance-sheet assets and liabilities (further information can be found in the handbooks of Fernandez Rodriguez and Sanchez Fernandez [8][9] and Centro de Estudios Financieros[7], which serve as practical guides for the adaptation).

2.1 Annual accounts

As a result of the reform of the accounting system, the balance-sheet becomes the fundamental figure of the annual accounts [10] and the total equity is highlighted. Total equity is a broader concept than shareholder's equity (it is made up of shareholder's equity, revaluations and subsidies).

The biggest difference is on "the right side of the balance-sheet" which goes from having five blocks to only three (figure 2).

Figure 2: Items on the right-hand side of the balance-sheet

GAAP 1990	GAAP 2007
Shareholder's equity	Total equity
Deferred income	
Provisions for liabilities and charges	Non-current liabilities
Long term creditors	
Short term creditors	Current liabilities

Source: prepared by the authors

Basically the deferred income disappears, with the exception of subsidies that pass to total equity: the non-refundable capital subsidies are directly recorded as an income in total equity, while the subsidies received from partners or owners do not generate income and they are recognized in the shareholder's' equity. In the balance-sheet, subsidies and revaluations appear as net quantities of its related tax effect. This must be taken into consideration when calculating the autonomy of society.

Provisions become liabilities and, depending on the term, they will be considered as current or non-current liabilities.

Concerning the assets and rights of the company, the criterion used for differentiating between current and non-current assets is no longer always considering a year, it can also be the operating cycle provided that it is longer than a year. This is also another change that has a great influence on the calculation of solvency.

The extraordinary income disappears from the profit and loss account, which in the GAAP 2007 is presented as a list in which the results are classified by their nature. As a result of this disappearance, all the results arising from sales of fixed assets become part of the operating income, modifying the profitability in the same way. In other words, if the company has had a profit from the sale of a fixed asset, ROA increases irrespective of margin. Something similar happens with ROE that capture in the numerator the net profit and the results arising from the concept "discontinued operations".

Two new financial statements are included in the Spanish GAAP, the statement of cash flows (SCF) and the statement of changes in equity (SCE), that until this moment were not taken into account in the business analysis [18][19][6][11],. Studies conducted by authors such as Vila Biglieri [20], Carcasona and Jimenez [5] or Rodriguez-Vilariño Pastor [17], Villanueva Villar et al. [21]: have shown that cash flows are usually better indicators of a company's solvency than

traditional ratios, taking as a point of departure the idea that obtaining a profit figure of more than zero, an ample working capital, and a positive self-financing capacity does not guarantee that cash flows are sufficient to meet payments.

Moreover, the viability of a company would be guaranteed if cash flows come mainly from ordinary operations. In this light, authors such as Arnold et al. [4], Mills and Yamamura [16] and Maseda Garcia and Iturralde Jainaga [14] have verified that the most representative ratios for studying the liquidity and solvency should be based on the magnitude of operating cash flows, which in the SCF would be represented by flows from operating activities.

2.2   Tangible fixed assets

One of the major novelties in the Spanish GAAP is the differentiation between tangible fixed assets, investment property and non-current assets held for sale. We therefore move from a single category within the balance-sheet, the "tangible fixed assets", to having at least three possible locations for the company's tangible assets:

- Tangible Fixed Assets (Standards 3 and 3): this category is aligned with its classical definition, and includes all the fixed assets that are to be used in the normal or usual production process of the company.

- Investment property (Standard 4): this new category addresses the need of locating the buildings that are not intended for the usual activity of the company, although they are a means to generate income or capital gains, i.e. the income generated by this kind of investment arises without relying on the activity of the company.

- Held-for-sale assets (Standard 7): this is also a new category in balance-sheet, included within the "current assets", that arises when the company's managers have a plan to sell fixed assets in the short term and, therefore, investments should be recovered via the sale, not via their use in the company. Even though the previous use and the characteristics of the good fitted into a tangible fixed asset, it becomes a current asset (readily converted to cash) after the new business decision to sell.

The first two categories are placed in non-current asset, while the held-for-sale assets are placed together with the inventories in the current asset. This has a direct effect on solvency ratios, in which these assets are considered as a liability. In addition, these assets are not depreciated. Therefore, the expenses decrease and the profit increases and this would affect both ROE and ROA.

One of the most relevant changes in tangible fixed assets is the disappearance of the former group 20 of the GAAP of 1990 ("amortizable expenses"), which can be recorded as: 1) expenses for the financial year, if they are cost of first-

establishment or 2) less equity, if they are related to the incorporation costs. This means that newly created companies reduce their financial autonomy, because of a decline in these expenses in reserves, and/or their profitability, because the profit is lower.

Other changes that increase non-current assets are, for example:

- The new regulation of trade swaps that could generate profit (because they are no longer valued at net book value but become registered at fair value).

- The valuation of non-cash contributions at fair value.

- The activation on the acquisition price of the present value of the costs related to certain decommissioning provisions and the reduction of all sorts of discounts on the acquisition price (including cash discount for prompt payment).

- The obligation to activate financial expenses (associated with fixed assets) if the asset takes more than one year to be into operating condition.

In all these changes, the initial value of non-current assets is increased when they enters the company, thus reinforcing the company's autonomy.

Concerning the subsequent value, once the asset is accounted for in the company, there is no change because the Spanish GAAP regulates impairments and depreciations in a similar way as it was done before.

Spanish GAAP does not include the great innovation of international regulations, which is the possible subsequent valuation of non-current assets at their fair value. This would have a major effect on ratios because if revaluation is taken to the profit and loss account then ROA will decrease, and if it was recorded as a reserve then the financial autonomy of the company will improve. Figure 3 shows a comparison between the fair value treatment in international regulations and in the Spanish GAAP.

Figure 3: Fair value in International Accounting Standards (IAS) vs. Spanish GAAP

REGULATION		ELEMENT	DIFFERENCE POSTING
IFRS	MANDATORY	Financial instruments held for trading, including derivatives	Results
		Financial instruments available-for-sale	Net/Results
		Biological assets and agricultural products	Results
	OPTIONAL	Tangible fixed assets	Net
		Intangible assets	Net
		Investment properties	Results
SPAIN	MANDATORY	Financial instruments held for trading, including derivatives	Results
		Financial instruments available-for-sale	Net
	OPTIONAL	The obligation to measure at fair value the patrimonial elements other than financial instruments may be established, as long as such elements are measured uniquely in accordance with this criterion in the Regulations of the European Union (Reform Law, art. 38. 5 of the Commercial Code).	

Source: prepared by the authors

2.3 Intangible assets (former inmaterial assets)

In order to recognize an intangible asset, it has to be "separable". Moreover, brands or other internally generated intangible assets cannot be recognized.

The recording of the financial leasing as a fixed asset (former "rights on leased assets" account) disappears and the asset is directly recognized according to its nature. Debt is recognized at the present value of the payments and not at the redemption value. This means the disappearance of "deferred interest" and that finance charges are taken to the profit and loss account according to accrual criteria. This involves estimating the effective interest rate of the transaction and updating the values at every moment, in order to know the amortized cost of the debt, applied to both short-term and long-term debt.

2.4 Financial instruments

The great innovation is the classification of financial assets and liabilities according to how the company expects to recover or cancel the debt, knowing that, in general, they will be valued at the time of acquisition at their fair value [15].

In subsequent measurement, financial assets must be measured at fair value, giving rise to differences according to their classification. The changes arising from the recognition of held-for-trading assets at fair value are taken to the profit and loss account and this has consequences on ROA and ROE. The changes arising from the recognition of held-for-sale assets at fair value are directly taken to equity and this has consequences on the company's indebtedness and autonomy. Finally, trading in own shares is recorded by decreasing the figure of total equity.

2.5 Inventories

There are no major innovations in this area in the recognition or in the initial valuation of goods, except for the disappearance of the inventory valuation systems known as LIFO and Standard Cost, which generally reduced the closing stock values. The valuation system used is of particular importance in the solvency of the company.

It is possible to recognize the cost of stocks incorporated in services, which involves improving the solvency of service-companies working on a multiannual project.

In the sales revenue standard disappears the differentiation between volume discounts (or sales rebate) and financial discounts, since all discounts will reduce the amount of the sale. This implies a reduction in turnover that has an impact on economic profitability (ROA).

Finally, and similar to that mentioned in the case of fixed assets, income arising from deferrals is taken to the profit and loss account as a financial income as the accrual occurs (income to be distributed in several years disappears), which means a reduction in own funds and autonomy.

2.6   Provisions

Provisions, understood as uncertain liabilities with respect to their amount and/or their cancellation date, are greatly reduced and directly included in the company's liability. Provisions for extraordinary repairs and reversible assets disappear. The valuation of them is made by the best estimate of its present value. This has a negative impact on indebtedness, liquidity and solvency.

Contingencies appear. They are not recorded, but they should be reported in the Annual Report.

In the case of liabilities linked to long-term staff payments, a distinction is made between: 1) defined contribution plans, in which no actuarial or investment risk is assumed, so they are recorded as a period expense and this has consequences on results and profitability, and 2) defined benefit plans, in which there are actuarial and investment risk, so a provision (liability) is recognized for the committed remunerations and this has consequences on indebtedness and solvency.

2.7   Changes and subsequent events

The changes in accounting criteria or error handling (if significant) must be booked retrospectively in equity, affecting the ROE. Changes in accounting estimates will be booked prospectively, according to their nature, in equity or in the profit and loss account, as appropriate. They also must be reported in the Annual Report.

Relevant events that existed at the end of the financial year, but which become apparent at a later time, must be taken into account when preparing the annual accounts (if they have not yet been prepared) or when reformulating them (if they have already been prepared). They will originate an adjustment or entry in the Annual Report. Relevant events that occur after the end of the financial year do not give rise to any adjustments, but it is necessary to report them in the Annual Report.

3 Conclusions

Spain has modified its GAAP to align its regulations with the process of international accounting harmonization. These changes, as has been shown, have a direct impact on the different balance-sheet items that make up the annual accounts and serve as the basis for economic and financial analysis. In particular, the autonomy of companies improves as the equity increases due to the effect of revaluations credited to reserves.

In addition, there will be changes in the liquidity and solvency ratios with different signs, depending in each case on how they are affected.

This first exploratory work encourages us to carry out an empirical investigation that allows us to quantify these effects on the companies listed on the Spanish Stock Exchange.

Moreover, it would be interesting to know how the accounting systems of other countries have been adapted in order to be able to determine whether the effects on the performance of companies vary according to the accounting criteria applied.

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Talent management at Obuda University focusing on teachers' and students' roles

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"…universities must move away from traditional collegial structures and adopting more managerial approaches" (Bradley, 2016)

Abstract: We examine how to motivate young people with promising intellectual abilities as an increasingly important topic of excellence in education. Regarding to Obuda University's mission, talent management should focus on three basic cores: teaching, research as well as servicing and supporting. Conceptually the paper focuses on opportunities which include different ways to obtain the possibilities for talented students. On the other hand, we should take teachers and professors into account, who must step into a new role where it is, no longer enough to be a source of knowledge, but have to challenge students' interests, fostering their capabilities and increase options for them to work in diverse projects – real or virtual -, fields and teams. We provide a systematic overview of how to support talent management in higher education, in case of the Obuda University's Safety and Security Studies of Bachelor and Master level. First we provide a short state of art after we show best of practices from the field of honours' programmes.

Keywords: talent management, higher education, honour students 'programs, teachers' roles

JEL classification: I2, I23, M53

1 Introduction

The Bologna Process as a series of agreements between European countries targets to ensure comparability in the standards and quality of higher education qualifications and the Lisbon Recognition Convention is one of its main instruments, creating comparable academic degree standards [8]. Therefor these standards form relatively comparable contexts for member countries, and facilitate globalization but inhibit special customized education programs [6]. Although, in recent years, a cultural shift and globalization have gradually made more room for excellence and talent development in the national discourses. But, in order to enhance HEI 'competitiveness' by cutting down costs, the number of participants is growing that leads to formal mass education and removes non-formal customized training programs. Moreover the universities face with more and more extended tasks. We focused on talent management in the Higher Education Sphere. The question is given: where is the place of talented students who require more and more focused attention? And what is the current situation regarding talent development and excellence in European countries?

Recent easiness of international higher education system due to fall of globalization brought many positives (e.g. higher diversity of foreign students, staffs and professors, bigger competition between institutions and wider possibilities) as well as negatives (e.g. elimination of local specialities, missing of targeted focus and strategies, over complicated hierarchical systems, mass educations). Aim of this study is analyses of the climate for talent development in Hungary and shows one of the best practices at the Hungarian Obuda University. What kind of talent management strategies can be identified at our university? We examine how to motivate young people with promising intellectual abilities as an increasingly important topic of excellence in education. We provide a systematic overview of support talented students in higher education (HEIs).

The research is performed mostly on state of the art sources as international literature and primer qualitative interviews with experts at Obuda University. We follow the Honors in Europe project, which carried out and evaluated a non structured interview guide (non structured i.e. based on own experiences and stories). Due to this method our study provides benchmarking observation. There are discussed most important relations and events context and their possible impact on talent management in field of HE and some future expectations and through usage of strategy tools (e.g. SWOT analyses) recommendations can be later formulated. In sum this paper is a thought provoker study which hopefully continues with deeper empirical research.

2 State of the art

According to the most referred literature „Talent management is the process of ensuring that the organization has the talented people it needs to attain its business goals"[2]. But in case of the HEI, this definition is simple. Hence the HEI is clearly defined, structured and detailed, moreover the fields are well-organized that means most of the country level statistical offices follow and use the so called ISCED (International Standard Classification of Education). The main cross-classification variables of ISCED are levels and fields of education for fields of education. Related to fields of education three main terms are used Academic / Professional / Orientation unspecified. ISCED classifies education programmes by their content using two main cross-classification variables: levels of education and fields of education.1 Knowing this standard the problems are the following: Who is the target of the talent management whether (1) strictly the students (that calls honors-program) or (2) the whole institution with the main staff (professors and teachers), or (3) stakeholders also should be included. Additionally, these roles cover eachothers.
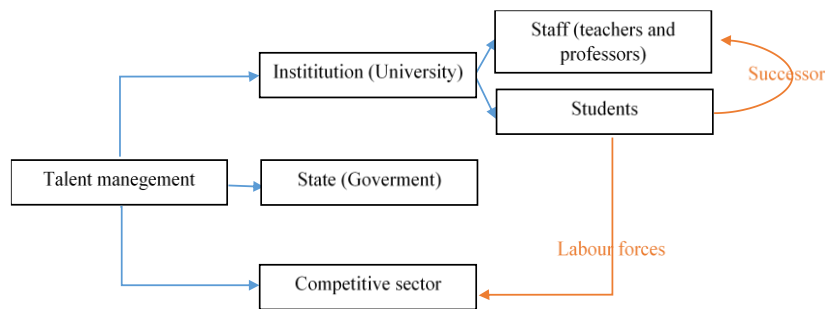
Figure 1 Subjects of talent management in the HE (Own source)

These overcomplicated roles end in a multilayer task system, where the teaching, researching and servicing as main strategies meet. In this paper we examined the three tasks shortly.

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1 http://ecahe.eu/w/index.php/ISCED_Fields_of_Study
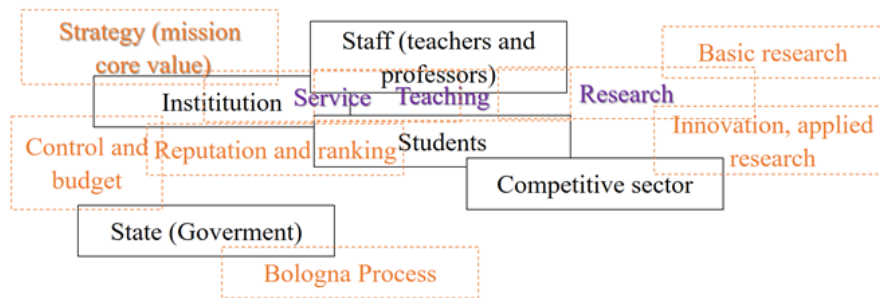
Figure 2 Process and aims of talent management in case of HEI (Own source)

2.1   Teaching

Seemingly this part is the most studied one. We refer to educational offers for talented students in higher education mostly as 'honors programs'. The honors curriculum meets the needs of the students in the program and features special courses, seminars, colloquia, experiential learning opportunities, undergraduate research opportunities, or other independent-study options. Although honors programs focus on the students, how the universities are able to satisfy their needs and improve their talents. But as Renzulli Center for Creativity suggested „Once students are identified for the talent pool, they are eligible for several kinds of services… Nowadays, education appears on the market as a provider. Today's consumer is diverse, new lifestyle features focus on 5 areas, health, environmental awareness, ethical behavior, authentic values, and individualism [16]. This cannot be ignored by the programs of educational institutions. These implications relate most directly to teacher training, resource procurement and management, product evaluation, and other theoretical concerns"

2.2   Research

Traditionally, universities have undertaken two core activities: teaching and research. While a university's research activities improve the educational outcomes of its undergraduates [5], research performance is the primary driver of global university rankings. Indeed, research quality is what separates top universities from their competitors in terms of public, industry and competitive sector. University rankings also contribute to a university's reputation which, that impacts student choice of study destination. Therefore, both teaching and research activities are critically important to a university's strategy and long-term success. „It is evident that individual performance systems have entered academia and that 'excellence' and 'talent' are predominantly linked to matters such as productivity, peer review, citation indexes and international refereed publications" [20].

Table 1 The key resource statistics in case of the best universities

Country (ranking)	The best universities in each country (subjects)	Indicators				
		Teaching	Research	Citations	International outlook	Industry income
United Kingdom	University of Oxford (1st in 2018 World Reputation Ranking 5th)	91.8	99.5	99.1	96.3	67.0
United Kingdom	University of Cambridge (2nd in 2018 WRR 4th)	92.1	98.8	97.1	94.3	52.9
Hungary (401-500)	Semmelweis University (medical, clinical and health)	24.2	12	66.4	36.0	77.9
Hungary (801-1000)	Budapest University of Technology and Economics	15.1	14.2	26.5	34.0	43.9

Source: World University Rankings 2019.

2.3 Servicing

Nowadays one more factor added to these aforementioned factors. According to the Europe Teaching Rankings 2018 made by the Times Higher Education [19] it can be found in the European best universities top 10 ranking eight universities from the UK and one French and another Spain. The question is given is the language so determining? Seeing the methodology of this study we can read that the students should rank their institute in 13 performance indicators that are grouped into four main key indicator factors: (1) engagement (2) resources (3)

outcomes (4) environment. The survey collected the views of more than 30,000 university students across 10 European countries (non from the Visegrad Countries) on a range of issues relating to their higher education experience. Regarding this, the environment and additional services provided by the universities are also underlined.

The so-called "third mission" include external and internal responsibilities. With this option tertiary institutions can create a dynamic relationship and active dialog between industry and business, government and society and often with foreign universities. With this strategy institution will be capable to integrate talent management into their academic programs and designing the tertiary education to service specialized and identified business needs and interests. Global competition brought a renewed and genuine concern of innovative and economic development of knowledge, can be obtained at tertiary and or at doctoral level of studies. All of these rather rapid changes might force the universities into a fast transformation of an entrepreneurial style of management and consequent education.

The external responsibilities consist of three different duties:

Liaise with governmental agencies: as a public university state's rules and regulations should be followed in the framework of higher education. This effort is also the one which undertakes the opening of new courses bachelor and/or master level, obtaining the required permissions and liable for accreditation. The Hungarian Accreditation Committee's complies with the EU standards and its chart shows how the institution is structured.
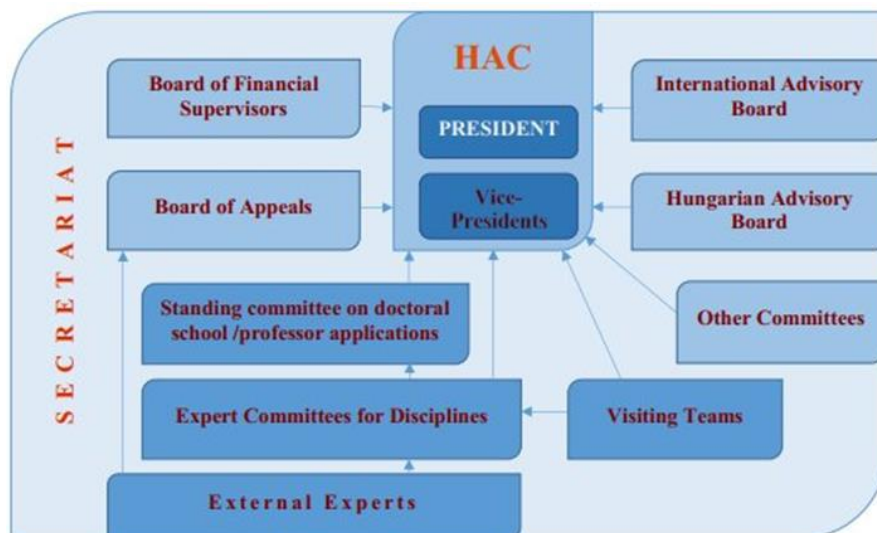
Figure 3. HAC Organization chart

Its mission statements states: "The main task of HAC is to evaluate and foster high level teaching and learning in Hungarian higher education institutions, and to

deliver quality assurance that supports each level and each participant of higher education. During its operation, HAC considers the legislation on higher education, performs its dedicated tasks, complies with the criteria set in the ESG 2015, and applies the objective, complex and up-to-date criteria developed by the HAC expert commissions and Board. With its activities, HAC reinforces its independent operation, and applies, develops and/or adapts a methodology in evaluation in line with international standards. HAC expert activities, accreditation, analysis and decision-making are built on an objective criteria framework, all activities are independent, unbiased, non-political, and follow the principal values set out in international standards." (The strategy of HAC 2017-2018, pp. 3. As seen on December 1st, 2018)

3 Solution at the Obuda University

To meet these standards Obuda University's mission statement corresponds by saying: "The mission of the university is to serve the economy through development and high-level knowledge transfer and innovation. The program of education is balanced to meet the demands of long-lasting basic knowledge, up-to-date professional and practical knowledge, and the application of these. The education process is built on the human relations and cooperative abilities of the students and professors. In this atmosphere students learn civic values naturally, and build them into their own scale of values." (OE Mission statement) Obuda University constantly builds and develops a competitive institution of higher education meeting the criteria and regulations of the European Higher Education Area.

1. Cooperate with business entities: as a research university it should find options to employ students and channel the way to future hires. It is also important – to take Western samples - to introduce dual study systems with the relevant industries. This relation can provide a common platform for research and point out the most needed business and industry needs and strategies, able to exchange information about future developments, new products and innovations.
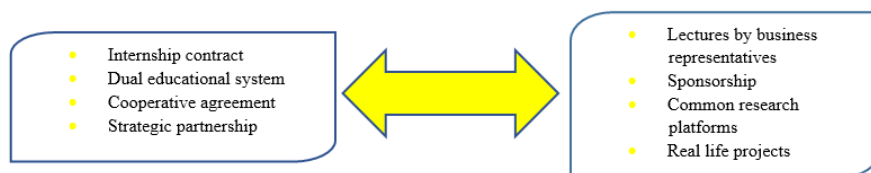
Figure 4. Dynamic relation between academia and the business world (source: author own table)

2   Collaborate with foreign and local universities: as a teaching institution constantly searching for new, innovative progress in teaching and research possibilities locally and globally. EU funded projects many times require inter-universities collaboration to execute international projects. Erasmus+, Erasmus Mobility and Tempus Public Funds are able to provide students' exchange programs, teachers, lecturers and staff trainings abroad and/or exchanging best practices as well as funding research studies, conference participation and scholarship programs. The internal responsibilities – within each institution – can also be differentiated from the basic tasks of teaching and research.

These are:

- Servicing students by establishing correspondence and distant education courses. This type of education significantly reduces the time should be spent at the university and enables students to take full time positions outside of the academic fields. Adding more value to this task last year Obuda University has created a baby care center within the institution for all those students who became parents but would want to continue their tertiary education. For this act Obuda University has been awarded first place of a „Family friendly workplace" in 2017. The university also provides libraries, modernized renovated accommodations, a canteen more cafeterias, possibilities for doing different sports and most notably has introduced a mentorship program. Within this program teachers play crucial roles by mentoring the needed ones, but also students are participating with noteworthy success to prevent failure at any point during the students' university education.

- Supporting students can be achieved many ways: by providing state and/or university funded grants, foreign exchange programs with reduced fees and costs for better or improved language skills, also for expanding competencies. The Obuda University also provides free learning options for the most talented ones and is giving opportunities for easier payments shall it be required.

- Obuda University has also implemented talent support by establishing the Doctoral School on Safety and Security Sciences, granting research application to abroad, organizing scientific conferences with students' participations as lecturers, inviting students to take part in EU funded research projects. From the students' side there is also a huge pressure to submit application to tertiary studies. It can be of social, traditional (generations of doctors, lawyers families' prestige) or demographic reasons to fuel students to spend more time in educational institutions. Governments are also supporting and actively encouraging people – mostly younger ones - for live long studies. Newer studies acknowledges that the Y and Z generations focus and genuine interest can be enhanced

by interactive and contextual teaching, while a data driven, "dry" teaching method might not result the expected outcome.

Talent management and support cannot be discussed without the teachers' roles in them. Earlier teachers were the main and sometimes the only source of knowledge. Nowadays this role is changing to a moderator-like way, rather than to be a "know-it-all" person. Their tasks from strictly teaching also seems to be shifting to somebody who channels the learning process rather than leading it, especially in tertiary education. Nurturing the talented young adults and further encourage their motivation are also became an added task with utmost importance.

- Within the academic framework there are many possibilities to enhance students' performance and acknowledge their talents. At the Safety and Security Sciences these are the most basic options to enter into a rather research driven, creative field:
    - PhD studies at the Doctoral School on Safety and Security Sciences
    - Students' Research Society being held twice a year. Even though topics are various most students can present their own research. The regarded papers at the latest competition were cited in the following areas:
        - ➢ Mapping and fault analysis of the sensor network of electric vehicles
          By Szilard Tuloki
        - ➢ The industrial applicability of artificial intelligence
          By Tamas Piricz
        - ➢ A general security assessment of migration to the EU
          by Janos Daniel Hajduk
        - ➢ The terrorist threat of festivals
          By Peter Torok and Csaba Mester
        - ➢ Investigating modern security screening technologies for personal screening
          By Achilles Martin Dudas
        - ➢ Hackers and their presence in cyberspace
          By Botond Krisztian Frey
        - ➢ Discovering wireless networks with uav
          By Sandor Barnabas
        - ➢ Biometric identificationfor border protection
          By Alzyod Hussein Mohammad Hussein

    - International and Local Conferences with students participation

        - ➢ International Engineering Symposium at Banki (IESB)International Mechatronic Student Micro-Conference (IMSC 2017)

- ➢ French-Romanian-Hungarian common doctoral research programs

- ➢ Competence based technical training symposium

- • Scientific Hubs

  - ➢ The applicability of biometric devices at entry points in bulk buildings

  - ➢ The role of the surface in tribological processes, the possibilities of modeling the surface

- • Security Study group
- • E-learning courses
- • Special courses

  - ➢ Work safety training
  - ➢ Special work related accidents and occupational hazards training

- • Erasmus Charter for Higher Education (2014-2020)
- • Mobility Scholarship
- • Tempus Public Foundation to support research and academic studies
- • Professional site visits
- • Bankut
- • Kazincbarcika

- • Competitions

  - ➢ Armed Security Guard National Professional Team Competition
  - ➢ Dough building – RECCS – International Competition

Conclusions

According to Bradley [5] it is not clear what the term 'talent management analytics' means for universities or specifically which set of metrics are strategically important and so should be measured? Whether which task is underlined? Who is the target? What states the strategy? Taking the international literature, regarding van den Brink and her colleagues [20]:

- • The ability to attract and retain top talent is rapidly becoming a key issue for human resource management at universities, as well.

- Universities are certainly not the only employers competing for highly qualified employees, and a number of recent surveys suggest that academic disciplines are already suffering from a chronic shortage of talented.

- The composition and quality of academic staff is vitally important for the quality of education programmes and university research, as well as the reputation and competitive position of universities and institutions in the academic community.

The worldwide competition is strong, when we just see the ranking of the best universities, each has different aim and strategy, but all of them are more than complex.

Table 2. The key resource statistics in case of the best universities

	The best universities in each country	Key statistics				
		Teaching	Research	Number of Students	Percentage of International Students	No. of students per staff
Hungary	Semmelweis University	24.2	12	10809	32%	9.6
Hungary	Budapest University of Technology and Economics	15.1	14.2	19499	7%	17.6
United Kingdom	University of Oxford (1st in 2018 World Reputation Ranking 5th)	91.8	99.5	20298	40%	11.0
United Kingdom	University of Cambridge (2nd in 2018 WRR 4th)	92.1	98.8	18749	37%	10.9
United States	Stanford University (3rd in 2018 WRR 6th)	93.6	96.8	15878	23%	7.4

(Source: World University Rankings 2019.)

Universities in Hungary are facing an increasingly higher pressure and enhanced competition not only because of shrinking governmental funding but also decreasing number of students. For this reason universities are forced to establish not only a system to accept students with highly diverse interests and capabilities but also to retain them by introducing a new competence and talent based educational plan and strategy compatible with governments regulations and at the same time in lieu with the most recent industry standards. The core tasks of a university of teaching and research are no longer enough. Most institutions must add other values to their established functions. In sum, in the definition of global

talent management are including: all organizational activities for the purpose of attracting, selecting, developing, and retaining the best employees in the most strategic roles (those roles necessary to achieve organizational strategic priorities) on a global scale. Thus, global talent management must be linked to an organisation's global business strategy, so a redefinition of the role of the human resource function would be necessary, with the work moving from being mainly focused on administrative support (for example in record-keeping and payroll) to a role that is more strategic, focusing on the alignment of talent management and leadership.

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10 minutes neurofeedback for better concentration

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Abstract: Neurofeedback and its usage in the bettering of concentration of children with learning disabilities have been studied in the past decades. Though the various studies show the effect of neurofeedback, be it in a positive light or otherwise, usually it is used as a standalone system. In this paper an other perspective is taken. Neurofeedback is integrated in a movement development course which is intended to improve various traits of coordination and personality of children which are linked to their studying abilities. Analyzing the gathered data and comparing it to previous work experiences one can draw conclusions how the course's effect changed and how it modified the participating children' possibility for success. Depending on this success it is possible that the overall cost related to learning disability could be reduced. Using these in formations estimations can be made how society would benefit if an ideal method for treating learning disability could be found.

Keywords: neurofeedback children movement-development concentration economic effect learning disability

1 Treatment of children with learning disability

1.1 Experience in Hungary

1.1.1 Various development methods

In Hungary if a child is diagnosed with a learning disability usually they are referred to a specialist who will treat the child through movement development. In previous studies it was shown that if children during their first one-two years don't go through the appropriate developmental steps, like for example crawling, their learning abilities and behavior will be affected [1]. Targeting the lower brain processes a more solid foundation can be created in the brain process' structure. After achieving this foundation can the connection between the lower and higher

centers be attempted to be repaired. These are achieved through various stimuli, in the beginning phase, mainly movement, which mimic an infant's moves. In the past 20 years different methods were developed based on results of this method, each with its unique characteristic and aim. Experience tells that the success of these methods varies from child to child. As the number of these methods rise it is increasingly hard to parents to choose a matching development type for their children. That is especially true when problems re-arise in school years even after a child has gone through several years of special courses.

1.1.2 Learning disability in school and it's possible effect

In the aforementioned case parents are skeptic and are looking for a quick fix in order to avoid problem in their life.This rush can negatively effect these children because they already have a built in pressure to perform so their parents can be at ease.[2] During work at a Hungarian foundation we as well have experienced that a few of the children, who we have worked with, came back in their school years. These children had trouble concentrating, old habits that negatively affect their performance came back. One possible cause of this that because of the stress they experienced, they lost the learned concentration which was the source of their success. This hypothesis is based on an observation that these children' cognitive behavior if measured with an EEG show that their concentration level is lower than their "normal" schoolmates.[3] This was personally checked using a commercially available EEG Headset.In addition tho this normally these children are already accustomed to normal development exercises and can feel that their work is futile. To avoid an extra addition to their frustration a new approach was needed to be put in use.

1.1.3 Neurofeedback

Parallel to the old exercises new tasks were added to the training regimen which were more appropriate to the children' age and more enjoyable.To serve as a new stimuli I created a simple neurofeedback system in DIY, which consists a Muse Headset, dry electrode EEG, an old radio car, and a smart-phone. Using this system the children are learning to control their mind-state, for example if they concentrate hard enough the radio car will move forward. This simple task serves multiple purposes. First it brings a playful element in the movement development which children often find wanting. Plus children love technology so their motivation is improved as well. It provides additional feedback to the specialist and the participant as well. If they can control the radio car well, and the observed brainwaves back it up, one can make a more educated guess about the child's efficiency that day. Using this method a few promising results were accomplished but the system is still in need of improvement. While participating children can achieve four or five times increase in their concentration level the observable effects form an outsider's point of view are not universal. Some perform very well

after the course, some have varying performance observed by the parents. Overall the quality of the provided service improved very much, children participate with more motivation, every occasion is made more suited to the individual child's need. Using these experiences one can guess how much plus is given to these children and how that will affect their success in their life.

2 Success and economy

2.1 Modelling success and it's effect on the economy

2.1.1 Economic price of learning disabilities

Considering the price of learning disabilities we must differentiate between the level of an individual, its family, and higher levels like national or society. On the individual level it is said according to the Roeher institute that the price over a lifetime of learning disability is around two million dollars. [4] If one works in the field or studies the literature it will be clear that we are not talking about exact number. This is an estimation, which can be understood as individuals with learning disability are more endangered to different factors, like stress, productivity loss or health issues. Over a lifetime the direct and indirect costs add up. Of course as a child the family bears consequences, but even then the situation is not simple. If we consider as an example that the parents must transport their child three or four times a week to extra education various outcomes can be speculated. It is considerable time which is spent with the transit of the child which could result in tiring the family out. Treatment of a learning disability can lasts years so over the time parents can be depressed because they will feel that they are fighting an overhill battle. These parents will be tired at work, are more likely to take a break from work etc. These are only examples from a personal point of view and experience. Of course in most cases parents take up these tasks because they want their children to be successful in their life. Question is what are the important factors of success?

2.1.2 What makes the difference?

Over the past years this question was often repeated, what makes one child with LD successful? Some say that these students come up with unusual strategies [5] or are more goal oriented [6] . In my experience the following determine the possibility of success: 0.4 x Inner environment+0.25 x School+0.35 x Extra activities.

Inner environment consists of genetics, family situation, physiological state of the child and other factors. School is self explanatory while extra activities are defined by their quality and how much plus they add in knowledge and skill to the child"s life. Depending on the attributes of the extra activities in an ideal case a positive feedback circle can be achieved. In this ideal case the child's improvement will affect the family, life at school. These changes will improve the child's confidence, goal-oriented attitude, which again will provide additional value. The goal is to push children above a threshold, from where on they can sustain a way of life where overall quality of their life is improved, it can be said that they are successful. This model in its form is far from done, various other factors and mathematical approach will be considered in order to improve. The main question is what efficacy can be achieved by the used movement course enhanced with neurofeedback. Unfortunately the gathered data is insufficient to precisely state anything, so only theories can be made what would happen if most of the "problematic" children would become later on successful.

2.1.3   Society's benefit

According to Eurostat there were 167 million children and young adults in EU-28. If we say that 10 percent of this population has learning disability that would mean 16.7 million people who must fight with this burden. Some of them must be successful, others not so much. Though we use this number as an estimation who are in need or would have been in need for some sort extra course in their life we get how much society would benefit. Naturally there does not exist a perfect, ideal method that solves all problems. It must be questioned that depending on efficacy how much can children be improved and how much the cost of a lifetime of learning disability can be lessened. Normally everyone wants their children above 90 percent but in reality that is no so easily attainable. Depending on the circumstances different outcomes can be achieved during these developmental courses. If we take a pessimistic approach and say 40 percent of the 2 million dollars can be reduced, that would mean 800000 dollars benefit for a person during their life. It must be stressed that this benefit does not mean one will get this sum as actual money, but probably will spend less because of stress, lack of concentration. This will mean they can spend more on themselves or spare more for their older years. If we take these numbers the following calculation can be made for society's benefit:

$(16.7*10^6)*(800*10^3)=1.33*10^{13}$

That would mean 13.3 trillion dollars which could be used by this portion of the young population for self-improvement for instance in the next 40 years. Why is success and self-improvement so important these days? Stress and depression are already a problem which affects today's workforce. In coming years this pressure can possibly be multiplied as climate and demographic changes pose new challenges in the future. This can result that the social burden becomes

unsustainable on the young.[7] Facing these problems should be a priority and part of the solution is to prepare the upcoming generations. Preparing the young can be done differently. Parents can take the children themselves to special training, or pay for private schools. A possible solution could be an another kind of school which is specialized for children with learning disabilities. In this ideal school different developmental methods would used alongside neurofeedback to ensure proper development. Naturally the price of such a school would be considerable but comparing it to the benefit it is small as an investment. Especially if the number of children who are in need of some kind development is on the rise as discussed in my previous work.[8] On the other hand if in this case the Eu's population would spend less on stress and productivity loss that would be an improvement in the quality of life.

Conclusions

Overall in this paper the following are highlighted. Children who went through movement development courses get sometimes in stressful times. To help them I started developing a neurofeedback system which augments the movement development targeting these school aged children. Using these experiences gained during work and previous research the possibility of success of these children is analyzed. If a better suited method could be achieved and the children could be more successful the cost of learning disability could be reduced. Depending on how much the associated 2 million dollars can be converted to "benefit" different changes would happen in the quality of life on an individual level. These sums assumed were spent on self improvement would mean that society could have a reasonable number of improved workforce. In face of demographic and climate changes which will pose challenges for everyone in the next decades bettering future generations is an important matter.

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Human Safety requirements based on a steering by wire system

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Abstract: Steering systems are one of the most significant components in vehicles since they directly related with drivers, and their performance considerably affects the steering feel. However, steering failure can cause hazardous driving situations. Therefore, the contribution of this paper is two-fold. First, it describes the research effort to assess the functional safety requirements related to a steer-by-wire (SBW) system by applying a number of hazard analysis techniques. Second, it presents a fault-tolerant architecture that can be used for SBW systems to improve vehicle safety through better steering capability. The results of this study provided support for drivers with their driving tasks, and an alternative controllability SBW system was used.

Keywords: SBW, hazard, safety, fault.

1   Introduction

There is an ever-increasing demand on the automotive industry in areas like safety, driving pleasure and environment. This requires new complex functionality to be implemented in cars. Transport safety and road safety especially has been accorded high importance on international development because of its magnitude and effect on the society and economy. Global key risk factors, identified by WHO in [1] for traffic accidents are speed, drink driving, motorcycle helmets, seat belts, and child restraints. The general highway traffic safety administration instituted the electronics reliability research area to study the reduction and safe management of electronic control system failures and operator response errors, the

hazard analysis techniques have been used in the development of conventional automotive systems and the fast progress in automotive electronics have increased The number of new characters for automobiles. In many cases, these are new entertainment or driver information features [2]. The increased use of microcontrollers in modern automotive systems have created many advantages, such as merging chassis control systems to achieve active safety with passive-safety systems. when chassis control electronics discover an out of control condition. Stability control can be linked to steering or implement automatic control of oversteering, it has also carried the potential for catastrophic failures [3].

Steering systems are very important components in automobiles because they straight interact with drivers, and their performance greatly affects the steering feel. Steer-by-wire (SBW) systems, which have no mechanical linkage between the steering wheel and front wheels, are assumed to improve vehicle safety during better steering capability. SBW system failures, however, can cause hazardous driving situations. Electronic stability control (ESC) has been developed to improve automobile stability via braking force control. Many vehicles are now equipped with ESC, which is to distinguish as a beneficial device to improve vehicle stability. In the future, a new automobile regulation will demand every vehicle to be equipped with ESC. However, these devices assume in normal driving conditions without steering system failure. Two areas, within driver steering interaction, were identified as most valuable to be able to design effective active safety systems. first was to find a map for results that received in research on cars and The other was to better understand driver behavior at a sudden lateral disturbance. Hazards are potentially unsafe events or conditions that could lead to undesired consequences or events. System safety engineering is the application of engineering and management principles, criteria, and technology to provide a reasonable and achievable level of safety together with other system design constraints throughout all phases of the system lifecycle [4]. A separate set of analysis techniques are suitable to determine the completeness of specifications [3].

This paper reviews some existing vehicles systems that are forerunners to x by wire systems and suggests a fault-tolerant architecture. We will focus on describing the main design analysis techniques.

2 Control By-Wire Technology

Embedded electronics, quick developing area, and software-based systems are progressively replacing the mechanical or hydraulic ones. First by wire technologies have been advanced in a flight, in enormous aircraft hydraulic and mechanical connections between input devices of a pilot and the actuators have

been replaced by electronic wires. The pilot provides his orders by the cockpit [5] . There are several different types of drive by wire systems, which is why it's sometimes referred to generally as x by wire the main by wire systems. Steer by wire, throttle by wire, brake by wire. In this paper, we are especially use a steer by wire subsystem. The lower reliability and different fault behavior inherent in the electronic and electrical components used in drive by wire systems without mechanical backup have made the transition from systems with mechanical backup extremely challenging. Nevertheless, fault-tolerant electronic systems must be incorporated to meet the high safety requirements set by governments, especially in developed countries. An example for replacing the mechanical or hydraulic system is a steering system. However, there is no steering column between the steering wheel and the front wheels in a steer by wire car, instead of the mechanical linkages there are electrical signals. Therefore, there are new dependability requirements for the electrical system. The causes of this evolution are technological in addition to economical. Consequently, the cost of hardware components is decreasing while their performances and reliability are increasing. This evolution, formerly confined to functions such as motor control, wipers, lights, or door controls, now affects all car domains, even for critical functions such as throttle, brake or steering control. an increasing number of vehicle engines have been manipulated by an electronic pedal and an electrically driven throttle or injection, which represent the first drive by wire components, such systems are equipped with a fail-safe function. The future systems become more advanced in functionality, design, and applied technology, the need for a comprehensive hazard analysis approach becomes more clear. Technologies such as by wire that do not rely on mechanical linkages for backup must be analyzed so that an adequate level of redundancy is designed into the system, and that other appropriate hazard controls are satisfied.

3 Steer-by-Wire System

Steer by wire (SBW) systems are a relatively new advance compared to the traditional mechanical, hydraulic, or electric steering systems that are nowadays used for motor vehicles, It provides the potential advantages of enhanced vehicle performance [6]. Figure 1.a shows the steering wheel (SW) rotation given by a driver is transmitted through the intermediate shaft. The column is linked to the rack and road wheels. Thus, the road wheel angle is proportional to the SW rotation. An amplified hydraulic pump is used to decrease the driver's steering efforts. In SBW, Figure 1.b, the intermediate shaft, and the hydraulic pump are removed. And several position sensors and actuators are involved in the SW and Vehicle wheel (VW). In a steer-by-wire system, there is no mechanical coupling between the steering wheel and the steering mechanism. Although the mechanical linkage between the steering wheel and the road wheels has been eliminated, a

steer-by wire steering system is probably not only to implement a similar function like a conventional mechanically linked steering system but are additionally expected to present the advanced steering functions. Electronic power assisted steering systems (EPAS) and SBW is exchanging hydraulic power steering in many new vehicles nowadays [7].
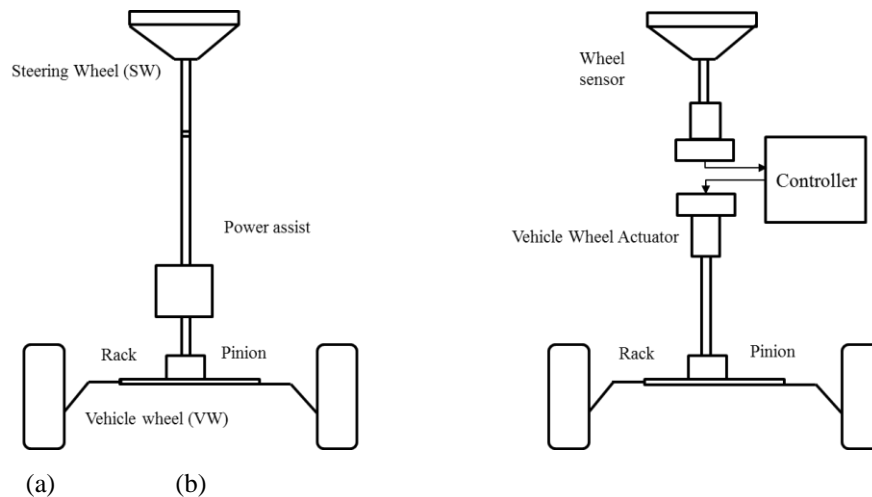
Figure 1: Conversion from conventional steering system to SBW [8].

SBW system is definitely the most complex drive by wire system which is also the large safety critical by wire system in a vehicle. In a pure steer by wire system, the steering column is eliminated. In a pure steer by wire system, the steering column is eliminated. Sensors mounted on the steering wheel are interpreted by the controller to generate the correct amount of road wheel angle using electric motors based on the vehicle velocity. If a sensor stops functioning properly, the controller will not be able to actuate the motors to generate the correct road wheel angle, potentially causing a hazardous situation. (SBW) systems allow the amount of steering wheel operation to be transmitted in the form of electric signals to the vehicle wheels. These systems help improve control performance for vehicle safety while increasing vehicle design freedom. Thus, this type of system seems to have promise as a next-generation automotive steering system.

As shown in Figure 2, the conventional hydraulic steering assembly has been replaced by an electric motor actuator to drive the road wheels in the road wheel mechanism. Road wheels are connected to a rack and pinion mechanism by tie rods. An angle sensor mounted in the motor or the rack and pinion mechanism is used to sense the road wheel angles. The steer by wire controller receives road wheel angle signals and makes a control signal to the permanent magnet brushless direct current (DC) motor through its electric drive. The most important aim for controlling the road wheel mechanism is to save the road wheel tracking for the reference road wheel angle. The reference road wheel angle signal comes from the

steering wheel assembly and changes according to the vehicle driver's intent and the vehicle dynamics requirements. This system consisting of the road wheel mechanism and its control is referred as the road wheel control subsystem.
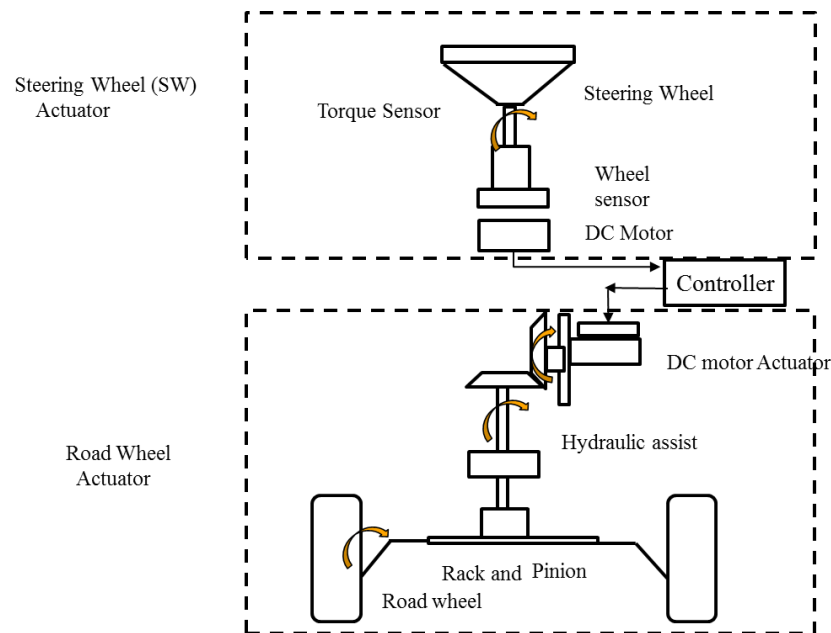
Figure 2: Schematic Diagram of the Steer-by-Wire System [8]

On the other hand, SBW system failure can cause unsafe driving situations. In the case of airplanes, significant redundancy in a fly by wire systems are effective to avoid hazardous failures. In the case of a mass-produced passenger vehicle, however, it is hard to install SBW systems with sufficient redundancy, as a result increase the cost, volume and weight.

4 Hazard and Safety Analysis Methods

Hazards are potential unsafe happenings or conditions that could cause undesired consequences or events, it also means the occurrence of an event that puts people in risk of danger [9]. Example of a hazard is losing a wheel of the vehicle when driving. This event puts the driver, walkers or other road users at risk of getting injured. A hazard happens when a fault propagates to an error that is not covered by safety mechanisms in a system. The interaction of undesired causes typically combines to result in a hazard in conducting a hazard analysis, the term hazard will be also used to describe scenarios that may cause harm. The Hazard Analysis

and Risk Assessment (HARA) as shown in Figure 3 is derived in combination with our customer, and availability is part of the safety goals.
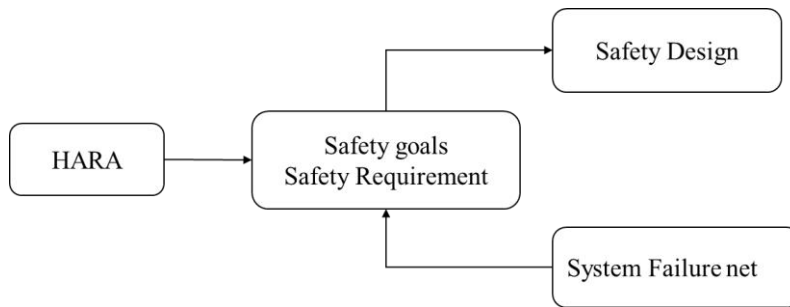
Figure 3: Hazard analysis and risk assessment.

Faults are potential physical or logical defects in the design or implementation of a device or system Under certain conditions, they cause errors like incorrect system states which can induce failures or a deviation from appropriate system behavior. The failure is a hazard when it leads to an incident. Notice that not all hazards can lead to faults. Hazards can also be produced by unexpected sequences of interactions between components or subsystems. Safety is intimately connected to the concept of risk, and generally means a relatively high degree of freedom from harm. As shown in Figure 4, the risk is a combination of the likelihood and the severity of an unplanned, undesirable event. A system is commonly considered to be safe if the level of risk is reasonable [10]. Reasonable risk must be evaluated according to societal, legal, and corporate concerns [11].
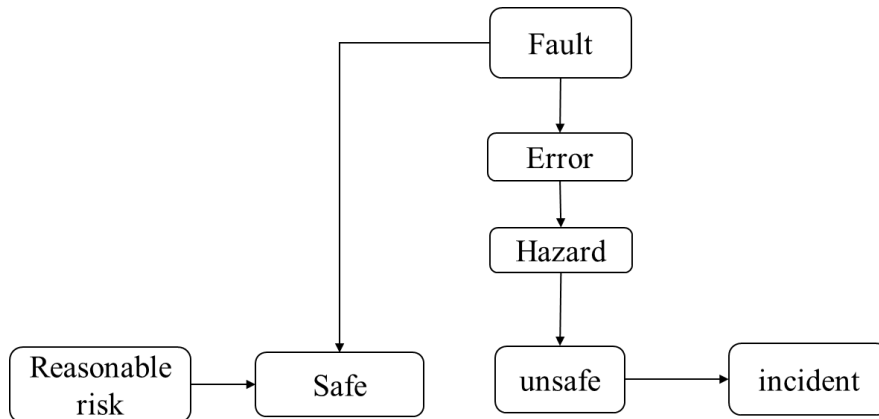
Figure 4: The safe diagram.

System safety also means a particular system of engineering that supports program risk management. It is the application of engineering and management principles, criteria and techniques to optimize safety. The aim of System Safety is to optimize

safety by the identification of safety-related risks, controlling them by design and procedures, based on suitable system safety precedence. System safety engineering is the application of engineering and management principles, criteria, and technology to provide a reasonable and achievable level of safety together with other system design constraints throughout all phases of the system lifecycle. A system-safety program for by-wire systems or any other type of system must be coordinated between vehicle manufacturers and suppliers. Application of a system safety program (see Figure 5) agree with a good method for improving and documenting the safety of a product design [12].

The objectives of a system safety program exclude:

• Identify potential hazards and associated avoidance requirements,

• Convert the safety requests into engineering requirements.

• Supply the design assessment to the continuing design

• Control the hazard by using the relative compliance of design for requirements and document findings.

• Straight and monitor specialized safety testing.

Figure 5: The Safety program.

5 Fault Tolerance Techniques

To create a safer system and more reliable, safety mechanisms have to be added for the system to be able to tolerate certain faults and avoid the system from propagating to a critical failure. This paper describes some techniques for increasing the reliability of a system. Fault tolerance can be implemented in both hardware (HW) and software (SW) fault [13]. The detection of significant faults that endanger steering control is an important aspect of the system. Figure 6 shows the concept of fault tolerance is related to dependability:

- Availability

- Reliability

- Safety

- Maintainability

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                              ┌──────────┐
                              │ Operator │
                           ┌──│  Errors  │
                           │  └──────────┘
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                           │  │ Hardware │
              ┌────────┐   ├──│  failure │
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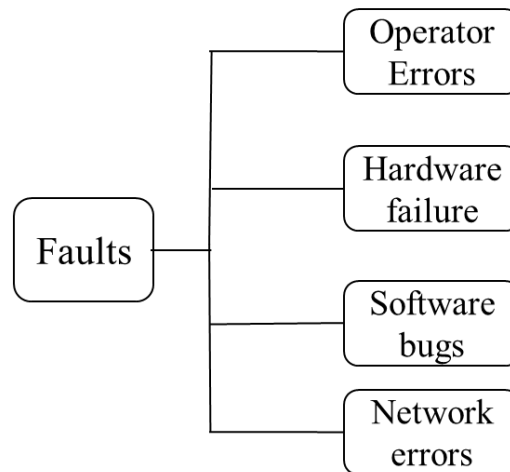
Figure 6: Illustration of the fault concept.

In the event of the SBW control module detects a fault in the system, the system will still need to provide directional control for the vehicle. in the intermediate SBW system designs, the SBW system is equipped with a mechanical clutch that completes a direct mechanical connection between the steering wheel and rack and pinion. in full SBW systems, the design may include redundancy of the power and control components of the SBW system. But because of the fact that there is no mechanical linkage between the steering wheel and the road wheels for SBW system, a fault from a sensor, actuator or microcontroller that form the control system may result in unwanted steering effects, if not controlled quickly in a fault tolerant manner. Hence, a fault-tolerant control system is safety critical in SBW automobiles, requiring highly dependable sensors and actuators, fast fault

detection and identification algorithms and a means for maintaining reliable vehicle control in the event of a fault. The steer by wire architecture involving the following components: ECU's, communication lines like CAN buses, and appropriate sensors and actuators. Thus the system requirements apply to the entire distributed architecture (i.e., hand wheel, road wheel, controller, ECU's, buses, software, sensors, and actuators). The overall safety-critical requirements for a given system belong to the following classifications: Failure requirements, safety goal requirements, domain requirements, and development environment requirements. There is a variety of real-time bus systems that are used to connect electronic control units in automation or in the automobile. Most of these communication protocols are one channel systems, although there are possibly some fault tolerance mechanisms, there is no really redundant transmission of messages. In some safety-critical applications. however, redundant message transmission becomes a requirement. A time-triggered variant of CAN, denoted in the sequel by TTCAN, is defined by the ISO standard 11898-4 as displayed in Figure 7. Basically, CAN and hence TTCAN is a one channel system, redundancy can only be provided by using multiple TTCAN buses. However, compared with intrinsically redundant systems similar to (FlexRay, TTP/C), the use of multiple single channel busses presents the problem of management of redundancy.
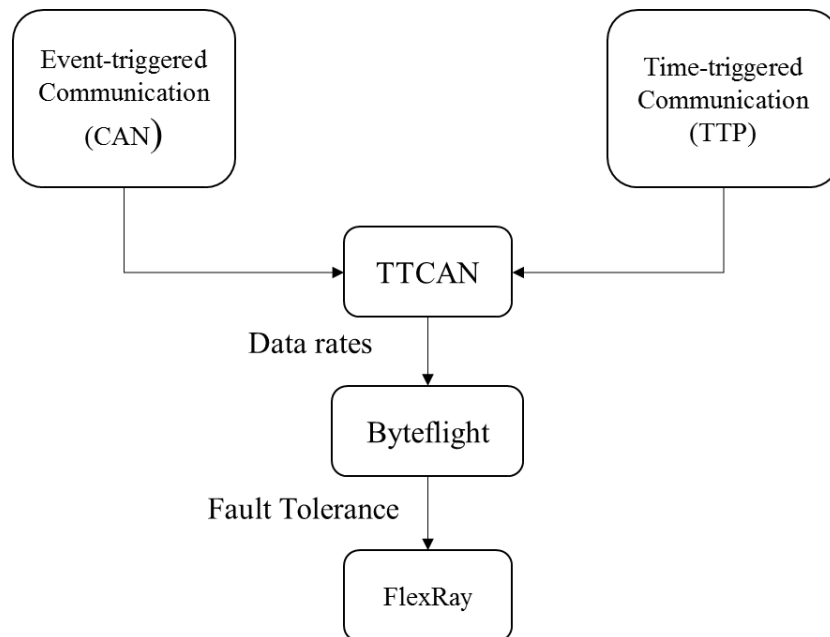
Figure 7: General structure for event triggered and time triggered.

6 Hazard analysis techniques

The hazard analysis techniques include analyzing different views of the system over the entire product design cycle and integrating the results, therefore a consistent and complete representation of the system's hazards, failure modes, faults, and hazard controls is made. A set of hazard analysis techniques as shown in Figure 8 can provide this useful multi-view analysis. These techniques are Preliminary Hazard Analysis, Reliability Block Diagrams Failure, Modes Effects Analysis, Failure Modes Effects and Criticality Analysis, And Common Cause. The Preliminary Hazard Analysis technique aims to identify great level system hazards and to find the criticality of potential mishaps that can arise. The most important steps for making it Provide a description of the hazard, and potential mishap scenarios related with the hazard, identify potential reasons of the hazard, find the risk of the hazard and mishap scenarios determine if the controls can be added to the system to eliminate or mitigate the risks. At this stage, only a hazard control feasibility study and system requests to control the hazards are wanted. while the basic steps for creating the reliability block diagrams technique Starting from the input and working toward the output, classify system components that could contribute to the specific hazard if they failed. For every element, made a block and place it in a position relative to its location in the input to output flow of the system. At each level, and for each intermediate event or component, consider command path faults and secondary faults, and primary failures for the failure modes effects analyze technique and also generate a Boolean expression of the tree to determine the combinations of principal events that can lead to the high-level hazard of the tree. Failure modes effects analysis and failure modes effects techniques used to Identify and list individual components, the function they provide, and their failure modes. And consider all possible working modes. The second important step to find the severity of the failure, the potential causes of the failure. For the Common cause analysis first step is to define and group the critical components to be evaluated. Within the groups, order for commonalities such as physical location, common manufacturers, a common design process that could lead a generic design defect, these techniques have been commonly used in the military, aerospace, and nuclear productions and the vehicle industry and each technique can lead more quickly to results that are closely linked to the particular strength of that technique. The use of multiple techniques raises the accuracy of a safety analysis program and increased the opportunity of assets that must be supplied.
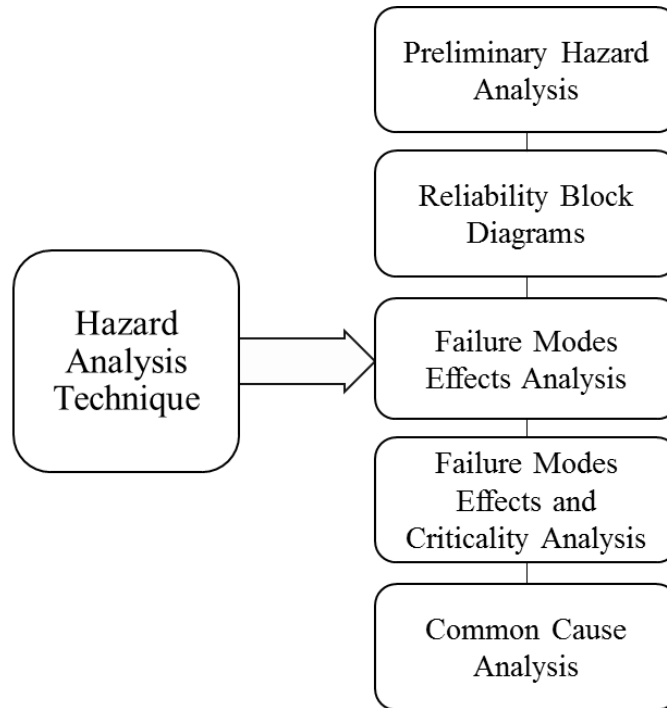
Figure 8: Hazard analysis techniques.

7 Conclusion

The proposed architecture has the potential to improve vehicle safety and reliability. This architecture is expected to facilitate the use of steer by wire system as an essential system for passenger vehicles. There are some possibilities for hardware and software architectures conditional upon the level of redundancy, and grade of error detection and fault recovery suggested by the system. Hazard analysis plays an important part in the growth of safety-critical systems. the application level for using the principles of engineering system that holistic approach was used to achieve safety at various levels.

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Profitability of Agriculture in a Service-oriented World

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Abstract: In the modern world, the importance of the service sector is increasing, while the signifcance of the agricultural sector keeps declining. What does this mean for the rural areas? Will every village be forced to abandon traditional farming and pursue touristic or industrial activities in the hope of development or survival? The aim of the study is to answer the question of whether agriculture can have a potencial for further development by examining the usual profitability indicators. Through a brief analysis of the village of Zomba, I show that this is a village with a characteristic agricultural profile. By taking a closer look at the companies in Zomba, I am going to confirm using relevant data that the profitability of agriculture is outstanding in suitable areas and high-quality arable lands can still be a valuable resource for a village, and provide long-term livelihood.

Keywords: agriculture, profitability, industrial commons, regional development

1 Introduction

The dominance of the service sector in the economy is typical today. In 2017, 63 percent of the world's total value produced came from services, 30 percent from industry and 7 percent came from agriculture. In the countries boasting the world's largest gross domestic products such as the United States, Germany, France, Japan or the United Kingdom, the weight of the service sector may range from 70 to 80 percent; accordingly, industry account for 10 - 30 percent, and agriculture between 0 and 2 percent [5].

This global economic trend can be observed in Hungary, too, where the agricultural sector accounts for 4.4 percent of total gross domestic product, while 30.9 percent of it comes from industry and 64.7 percent from services [3].

While agriculture and industry were the dominant sectors in the past, today, the service sector has become the most attractive one. Accordingly, a shift of strategic focus has begun in Hungary. From big cities to rural villages, the service sector is now considered the sector with the greatest development potential.

The aim of the study is to show that agriculture continues to be a lucrative sector and traditionally agricultural villages make a mistake if they abandon their lands prematurely. To prove this statement, I am going to research Tolna county, and more specifically the village of Zomba in the Bonyhad region. I will study the profitability of this farm-based settlement through the most commonly used indicators. In addition to simple net profit margin, such indicators include, Return on Assets and Return on Equity [2].

The study consists of four large sections.

In the first part, I will outline the most important concepts that the remainder of the study will rely on, such as the various profitability indicators [2], as well as the concepts of valuable resource [9], strategy [15] and the industrial commons [19].

In the second part I will present the industrial common of the Hungarian and Slovakian automotive industry, whereby I will show that the automotive industry is an immensely significant sector in the national strategy of Hungary. However, places such as Tolna county are excluded from these industrial commons.

In the third part I will briefly review the situation of Tolna county and Zomba using the available data [6][7].

In the fourth part, relying on the previous three parts, I will perform the profitability analysis of the Zomba farming units based on their balance sheets and profit and loss accounts [10].

2 Review of the Relevant Literature

The purpose of this chapter is to provide a brief review of the key concepts the rest of the study relies on.

2.1   Strategy

It is difficult to find a common and frequently used definition for strategy in the literature. Various authors [13][15][17][18] place emphasis on different ascepts of strategy. According to Krajewski *et al.* [13], strategy outlines a guideline that connects the company's activities as a framework. In Porter's view [17], the role of strategy is to choose the activities that the company should be doing differently from its competitors. Pisano's opinion [15] is that it involves mutually reinforcing activities aimed at achieving a particular competitive objective. According to Voros [18], strategy is a set of actions that create a dominant economic position through the use of key capabilities.

In this study, based on the above authors [13][15][17][18] I interpret the concept of strategy as a set of synergistic activities aimed at achieving some goal, more specifically, a competitive goal.

It can be seen that, while different companies may pursue a different core business activity, a national, regional, or even a city or village development strategy can be successful if it has a clear objective, and all other activities ar are calibrated to it.

It is easy to find examples for mutually exclusive activities; for example, it is hard to imagine thriving tourism and an industrial site in the same small town.

At the same time, I argue that it is difficult to imagine the same growth can be achieved both in agriculture and tourism in the same small town. Although the two activities are not mutually exclusive, the heavily limited nature of local governments' funds, and regional funds, and the utility of human resources imply that the efforts to achieve the two strategic goals together can easily result in a situation where neither of the goals is realized. This does not mean, of course, that there would not be or could not exist a geographic unit that provides outstanding results in several industries or branches of the national economy at the same time, only that the development aspirations of local governments and national governments cannot all bear the same significance and to the same extent, therefore a core activity of the regional development strategy has to be selected.

It is therefore preferable to choose a single activity that is the goal of the strategy. This puts small settlements in Hungary at a crossroads: Can they contunue their agricultural activities, for example? Can it be a viable model for sustainable development in the long term? Is it necessary to change the strategy of these towns and convert them to be focused on tourism in the long term, for example?

2.2 Profitability

To respond the questions raised above, I decided to study profitability in this paper. If agriculture can really represent a long-term sustainable model for rural towns and villages, then according to my hypothesis, the companies working in agriculture are profitable and their profitability shows a growing trend in time. If a downward trend is described by these indicators, then strategic change in the core activity is adviseable.

Indicators most commonly used to measure profutability include net profit margin, return on assets and return on equity[2].

To calculate these, one needs to have a company's revenues, earnings after taxes (net income), the value of its equity and assets. Revenue and profit after tax can be obtained from the company's income statement, while the value of a given company's equity and assets can be obtained from its balance sheet. Having this

data, in accordance with Brealey et al. [2], the above indicators can be calculated according to formula 1, formula 2 and formula 3 respectively.

$$Net\ profit\ margin\ = \frac{Earnings}{Sales} \qquad (1)$$

Net profit margin is the most wide-spread profitability indicator. It shows the quotient of the company's sales revenue and after-tax profit, that is, how much of the revenue flowing through the company during the period is realised as a pure profit.

$$Return\ on\ Assets\ = \frac{Earnings}{Assets} \qquad (2)$$

Return on assets measures the company's after-tax results to its total assets. This has the advantage of showing how well a company is using its assets.

$$Return\ on\ Equity\ = \frac{Earnings}{Equity} \qquad (3)$$

Finally, the return on equity measures the company's after-tax profit relative to the company's equity. The benefit of it lies in the fact that it excludes the company's capital structure, the company's debt and equity rate from the scope of examination, thus providing a good benchmark for examining companies with different capital structures.

2.3   A valuable resource

Through the examination of profitability indicators, my goal is to answer a general question: Is the land a valuable resource? A resource is valuable if it is difficult to copy, durable, appropriable, difficult to substitute, and better than that of the competitors'[9].

I argue that land can easily fulfill the first four conditions. There is currently no technology available to replace or imitate high-quality lands. The history of mankind is persistently linked to this durable, renewable resource. Where it can be assumed that private property is protected by the state, the profits generated on the land may be appropriated. The only remaining condition is that land should be a more valuable resource than its competitors. In this sense, land's competitors may be other activities that can be carried out by a settlement. If human and material resources can be better exploited, more value is created, for example by utilizing another valuable resource, such as a local tourist attraction, then a shift of strategic focus could be useful or indeed, necessary.

2.4 Industrial commons

In Pisano and Shih [19] industrial commons refer to the critical mass of suppliers, buyers and skilled labour in a geographic area. While Porter [16] emphasized their competition in the first place, Pisano and Shih [19] demonstrated the symbiotic relationship between these economic operators within the industrial commons.

These commons are created by being the most best reponse of competitors when they enter the market: settling somewhere near the centre of the existing competitor's supplier network. This attracts additional suppliers and skilled labour to the area, sooner or later the universities and the relevant infrastructure serving the common will emerge. An essential feature of industrial commons is that all economic players benefit from their existence, for example by the availability of greater human resources, the movement of which between the companies will facilitate the spread of knowledge.

The emergence of industrial commons is a self-strengthening process [19] and their existence in the 21st century is due to the very fact that transport costs are not zero, cross-border trade has to face a great deal of legal, administrative and cultural issues [11], and the mobility of labour is relatively low, thus moving it, for example to China, is unfeasible.

3 A Significant Sector in Hungary's National Strategy

The aim of this chapter is to demonstrate the central importance of automobile manufacturing for Hungary, using the concept of industrial commons.

This chapter is essential to reveal the essence of the problem: By mapping the cities involved in the automotive industry, I will be able to show that some areas of the country fall firmly outside the area of the industrial common proper.

These areas cannot, in any meaningful way, contribute to the operation of the automobile industrial common. This, coupled with the fact that the automobile industry is of such high importance to Hungary means that the areas outside it are of less importance to the central governement and have less employment opportunities and long-term growth prospects.

Therefore, the industrial commons shows the very basis of the problem, upon which any further study can be conducted, any solution may be proposed.

Table 1 Distribution of Hungary's export and imports by category, 2015

Main categories of export and import	Export	As percentage
Food, beverages, tobacco	2 048 118	7.3%
Crude materials	634 209	2.3%
Fuels, electric energy	651 722	2.3%
Manufactured Goods	8 703 318	31.0%
Electrical machinery, apparatus and appliances	3 519 691	12.6%
Road vehicles	5 020 712	17.9%
Other machinery and transport equipment	7 459 980	26.6%
Total	28 037 041	

Source: Central Statistical Office (2015): Statistical yearbook of Hungary.

Table 1 shows the magnitude of exports and imports of Hungary's products in billions of HUF in 2015 and their percentage distribution within total exports and imports. According the table, imports and exports of road vehicles in Hungary's foreign trade account for 17.9% of total foreign trade [4].

Hungary's gross domestic product for the same period amounted to 34 324 billion HUF [4], which means that the proportion of import and export to gross domestic product was 74% and 81%, respectively. Table 1 shows, therefore, that in comparison to her economy, Hungary trades heavily and that the automotive industry and related industries are of decisive importance in Hungary's foreign trade and economy.

Table 2 Hungary's eight largest export and import partners, in 2016.

	Export	Import
Germany	27.5%	26.4%
Romania	5%	3.1%
Slovakia	4.9%	5.3%
France	4.8%	4.9%
Italy	4.8%	4.8%
Austria	4.7%	6.4%
Czech Republic	4.1%	4.9%
Poland	4.1%	5.6%

Source: Central Statistical Office (2016): A report on export performance in 2016.

Does the automotive industrial commons around Gyor and Esztergom spread across the border? Although Pisano and Shih [19] argue that national boundaries are not particularly important for industrial commons, Ghemawat [11] points out that cross-border trade is much smaller than trading with domestic regions of the same distance. The question, then, is what the weight of Slovakia within the foreign trade in Hungary?

Table 2 shows the share of the eight largest import and export partners of Hungary in the total exports and imports in 2016. These eight countries together account for 59.9% of exports and 61.4% of imports [5].

The role of Germany is outstanding both in terms of exports and imports. However, it is also important to take into account the high share of states such as Austria, Slovakia or the Czech Republic. Based on the gross domestic products, Germany's economy, for example, is about fifty times bigger than that of Slovakia. In the light of this, the fact that Hungarian exports to Slovakia is 4.9 per cent and the imports is 5.3 per cent, means that these figures are really high compared to the size of the economy, since, according to the gravity models, the size of the economies of the two countries is a decisive factor here. Thus, it can be stated that Slovakia is one of Hungary's key foreign trade partners.

As both countries are strongly integrated, the notionby Pisano and Shih [19], that industrial commons may spread across borders, has to be taken into account in that Slovakia and Hungary has to be examined together.
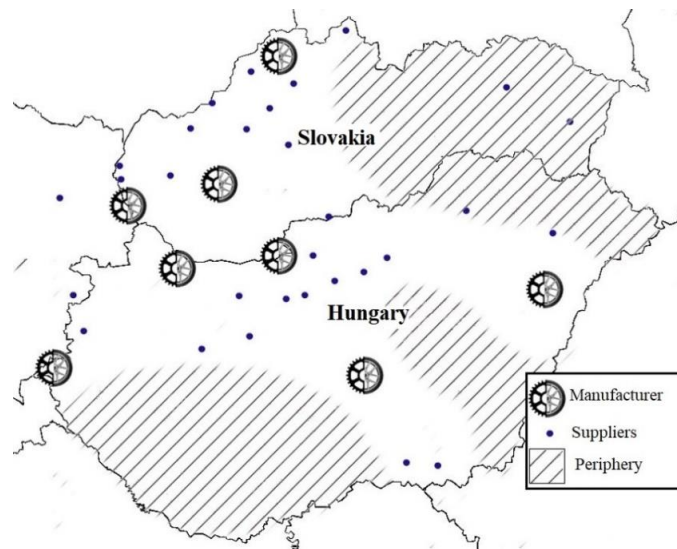
Figure 1 Automotive industrial common of Hungary and Slovakia.
Edited by the author

Figure 1 shows the automotive industrial common of Hungary and Slovaka. It is evident that apart from the the northwestern part of the area, this industrial common extends only towards Kecskemet and Debrecen.

This is an especially serious issue for the southern counties of Hungary and the eastern counties of Slovakia, which are completely left out of the leading industry of the two countries and are unable to take part in the emerging national economic

strategy. In the absence of this, it is particularly important for these regions to independently develop their own strategy based on other sectors of the economy.

One such area left out is Tolna county and the village of Zomba within it. They are not included in the industrial common of this national-strategy sector and therefore must find a different plan for long-term survival.

4 The economic background of Tolna county and the village of Zomba

I chose to study the viability of agriculture by conducting a study of an agricultural village. I chose Zomba settlement, located within Tolna county, in the township of Bonyhad.

The reason for this choice is that Zomba is a a typical agricultural village. Tourism is not particularly strong in Zomba, or in its extended area i.e. in the Bonyhad township and Tolna County. These two factors together mean that the profitability of agriculture is vital to Zomba. If it is not supported by the relevant data, the initial investment and time needed to shift strategical focus in this county would be one of the highest. This chapter is amined to support these statements with the relevant data.
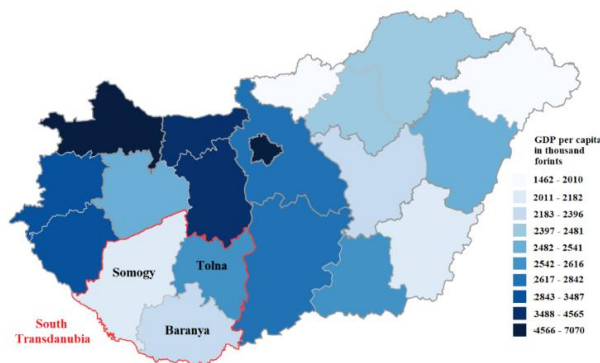
Figure 2 Per capita gross domestic product per county, in 2016.

Source: Central Statistical Office (2018a): Gross Domestic Product Per Capita (GDP per capita), 2016.

Figure 2 shows the gross domestic product per capita in 2016 per county. It is easy to see in the figure that the eastern and southwestern counties of the country are among the poorest. Tolna county, however, occupies the 8th place among counties with 2.57 million forints per gross domestic product. By comparison, the other two counties in the region, Baranya and Somogy, have similar data of 2.18 million and 2.13 million, and occupy the 15th and 16th places of the counties respectively.

Where does Tolna's high gross domestic product come from? The breakdown of gross domestic product by sector can help answer this question.

Table 3 Added value of the counties of the Southern Transdanubian region by sector.

	Baranya	Tolna	Somogy	National average
Agriculture	9.3%	10.4%	11.1%	7.3%
Industry	24.5%	42.0%	23.5%	39.1%
Services	66.2%	47.6%	65.4%	53.6%

Source: Central Statistical Office (2018a): Gross Domestic Product Per Capita (GDP per capita), 2016.

Table 3 shows that the added value of the service sector (47.6%) in Tolna county is lower than the national average (53.6%). While in all three counties of Southern Transdanubia the weight of agriculture is higher than the national average, in Tolna county, due to higher industrial performance, the distribution of added value is different.

As far as Tolna's agriculture is concerned, the cultivation of plants is decisive, while the weight of livestock production in the sector is negligible. 72.9% of agricultural area in 2016 was used to grow and harvest grain. (Central Statistical Office, 2018c).
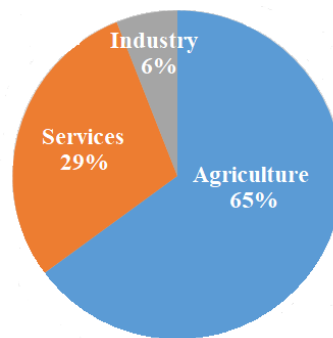
Figure 3 The revenues of different sectors in Zomba:

Edited by the authoer based on reports and balance sheets published by the Ceginformacios es az Elektronikus Cegeljarasban Kozremukodo Szolgalat (2018).

Zomba does not reflect the general dominance of industry in Tolna as seen in Figure 3. Figure 3 shows that 65 per cent of the total turnover of the 54 enterprises registered in Zomba was accounted for companies pursuing their activities in agriculture. Similarly to Tolna county, the contribution of the service sector is lower, however, unlike in Tolna county, in Zomba, not the industry, but the predominance of agriculture explains the phenomenon.

In order to understand the general situation of Zomba, an overview of tourism in Tolna county is to be provided.
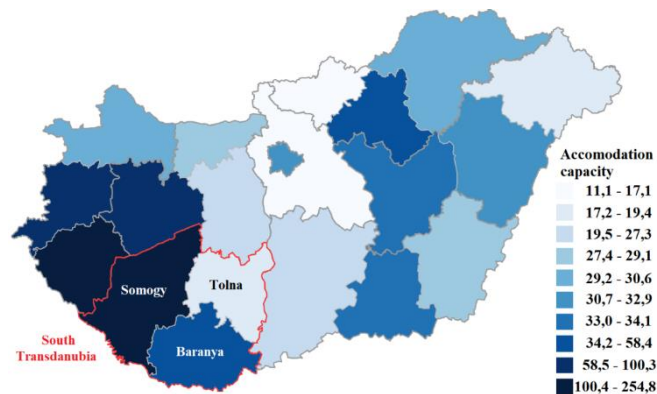
Figure 4 The number of commercial tourist accommodations per tousand inhabitants per county in 2016.

Source: Central Statistical Office (2018b): Commercial tourist accommodations per tousand inhabitants, 31 July 2016

Figure 4 shows the number of commercial tourist accommodations per tousand inhabitants per county. It is clear that the busiest counties are situated around Lake Balaton. Within the South Transdanubian Region, Somogy county had 254.8 accommodations for a thousand permanent residents, while Barany and Tolna counties had 34.2 and 17.9 accomodations per thousand permanent residents, respecitvely. The performance of Baranya county is above average in the country and ranks it into the upper third. Tolna county, however, belongs to the last bottom of the rankings, only Nograd (16.1 accommodations) and Pest county without Budapest (11.1 accommodations) have poorer results.

The poor performance of Tolna county is further reduced by the fact that the ratio of the rooms rented out and available, i.e. room capacity and utilization, is far below the national average (36.6%) in the county (25.5%). The low utilization of a low number of accommodations means that even a relatively small supply of accommodations in Tolna county does not meet consumer demand [7].

Bonyhad township, where Zomba is located, also performs poorly in terms of tourism in the Tolna region, with a total of 10.3 places for a thousand of permanent residents. Overall, it can be said that substancial financial resources woulr be needed in Zomba to boost tourism, as in Tolna county in general.

At the beginning of this chapter, I made two statements which I wanted to confirm with relevant data. The first claim was that Zomba was an agricultural town. To assess this, I have mapped the structure of the economy of the whole country and Tolna county, and as a result I have shown that Zomba has a strong agricultural dominance as compared to both the county and country. The second claim was that tourism in Tolna county was relatively weak. The national data supported this claim well, both through the number of accomodations and their utilization.

As a result, agriculture and its profitability is of vital importance to Zomba, which leads to the central question of my study: is agriculture profitable, and is land a valuable resource?

5 Calculations, results

The purpose of this chapter is to answer the above question and to demonstrate the way of responding, and the calculation process. In order to produce different index numbers, first some raw data have to be aquired, then a summary of the corresponding data, and then the calculation of the index of the year concerned. This sequence of operations is repeated until all of the indicators we want to examine are acquired for each year to be investigated.

Name of the enterprise	Revenue in 2017
MISOFARM Ltd.	126 787 000 HUF
MISAGRO Ltd.	182 784 000 HUF
TORMASI FARM Ltd.	26 330 000 HUF
ZOM Ltd.	755 923 000 HUF
Zombai Gazdaszovetkezet	88 694 000 HUF
Szucsi-Bor Ltd.	4 366 000 HUF
Szentgal Bor-Lics Pince Ltd.	97 515 000 HUF
Vintis-Agrarium Szoleszeti Ltd.	3 206 000 HUF
MINDOSSZESEN	1 285 605 000 HUF

Table 4 Revenues of agricultural production units in Zomba in 2017. Data are in Hungarian Forint.
Source: Edited by the authoer based on reports and balance sheets published by the Ceginformacios es az Elektronikus Cegeljarasban Kozremukodo Szolgalat (2018).

Table 4 shows the first step in the creation of aggregate data. From the annual accounts published by the Ceginformacios es az Elektronikus Cegeljarasban Kozremukodo Szolgalat [10], or more specifically from the income statement of the companies concerned, the revenue of the companies can be learned. For example, Misogfarm Limited Liability Company recorded 126.8 million revenue in the period reviewed, while the eight companies recorded a total of 1.285 billion forints in the same period. Similarly, comparable data for other years of the period under review, as well as after-tax profit, equity and total assets for the period under review can be produced. The result of this aggregation is shown in Table 5.

Table 5 Aggregate data of Zomba's agriculture between 2013 and 2017. The data are in million forints.

	2013	2014	2015	2016	2017
Sales	778	945	1 306	1 094	1 285
Profit after tax	94	207	302	294	350
Total assets	1 459	1 674	1 846	2 042	2 378
Equity	1 065	1 204	1 663	1 703	1 943

Table 5 shows the aggregated data of the eight companies that played a decisive role in Zomba's agriculture during the period 2013-2018. The data are in thousand Hungarian forints. In accordance with Table 2, the eight companies made a turnover of 1,285 million forints in 2017. During the same period, their after-tax profit was 350 million forints. The total value of the companies was 2,378 million forints, of which HUF 1,943 million was their equity.

The table shows a clear growth. While in 2013 revenues amounted to 778.9 million forints, in 2017 it was HUF 1 285 million: a 65 percent increase over the period. The after-tax profit is even more spectacular, rising from HUF 94.4 million to HUF 350.5 million during the years reviewed, showing an increase of 271 percent. It is immediately evident that although both data have increased considerably, the rate of increase in after-tax profit outweighs the growth in sales revenue. Considering Formula 1 again, this means that the net profit margin must have increased:

$$\frac{Income}{Sales} < \frac{3,71 \cdot Income}{1,65 \cdot Sales} \tag{4}$$

In Equation 4, on the right hand side, the coefficient 3.71 is derived from the growth of profit after tax, which has grown from 94 in 2013 to 350 in 2017. This means that by 2017 income has grown to 3.71 times the value in 2013.Similiarly, sales have grown from 778 in 2013 to 1285 in 2017, in other words, by 2017, sales have increased to 1.65 times value in 2013.

This is explained by the fact that according to formula 1. the net profit maring is the ratio of these two figures. Indeed, based on the data:

$$Net\ profit\ margin_{2013} = \frac{94\ 448}{778\ 858} = 0,1217 \rightarrow 12,13\% \tag{5}$$

$$Net\ profit\ margin_{2017} = \frac{350\ 050}{1\ 285\ 605} = 0,27228 \rightarrow 27,26\% \tag{6}$$

Similar data for other years of the period under review as well as Return on Assets and Return on Equity indices are produced similarly.

Table 6 Profitability indicators for Zomba's agriculture.

	2013	2014	2015	2016	2017
Net profit margin	12,13%	21,91%	23,14%	26,88%	27,26%
Return on Assets	6,47%	12,38%	16,38%	14,40%	14,74%
Return on Equity	8,87%	17,22%	18,18%	17,27%	18,04%

Source: Edited by the authoer based on reports and balance sheets published by Ceginformacios es az Elektronikus Cegeljarasban Kozremukodo Szolgalat (2018).

Table 6 shows best the dynamic growth of Zomba's agriculture. Increase in sales and after-tax profit could be a result of simple expansion. It is true that Zomba's companies are expanding as their total assets increased by nearly 62 percent, from HUF 1,459 million to HUF 2,337 million. However, it is also true that Zomba boasts an incremental growth in profitability indices, which means that the companies concerned can realise a larger and larger part of their revenue as profits and they use their assets more and more efficiently.
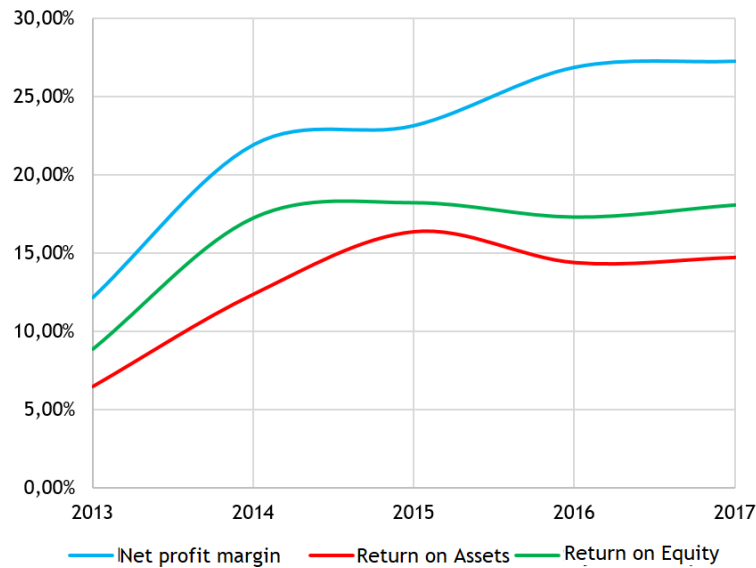
Figure 5 The profitability of the agricultural production units in Zomba in the period 2013-2018.
Source: Edited and calculated by the author based on the raw data of Ceginformacios es az Elektronikus Cegeljarasban Kozremukodo Szolgalat (2018).

Figure 5 is intended to illustrate this incremental growth. It is evident that profitability indicators grow steadily, with net profit margin rising from 12.1 percent to 27.3 percent, return on assets from 6.5 percent to 14.8 percent, and return on equity from 8.9 percent to 18 percent. The data thus justify well that agriculture is a lucrative sector capable of growing.

The figure illustrates well that this rate of growth slowly reaches an upper limit value, for example, the net profit margin, is going to flat out at around 28 percent, based on current data. However, a break in the growth is not particularly worrying, in most industries the double-digit profit margin is considered unusually high [14], thus Zomba can be satisfied if it can keep this profit margin in the long run.

If, in the long run, the profitability of agriculture in Zomba showed a declining path, I would argue that it is worth investing in the diversification of agricultural activity because tourism needs high initial investment.

In Tolna county, for example, 72.9 percent of the land is used for the cultivation of grain, which is the highest in the country[8]. This predominance of the grains puts Tolna and, with it, Zomba in a vulnerable position due to the fluctuation observed on the world market price of such crops. Based on the registered companies [10] growing wine grapes is already emerging as an experimental move. Currently, based on the data available, this is not profitable, but in the long run, it can help Zomba offset the risk of a single crop.

6 Comparison with Eastern Europe

Using the database of the Farm Accountancy Data Network (2018), the net profit margin for each of the 13 countries that have joined the European Union since 2004 can be acquired.

Country	Profitability
Bulgaria	28%
Cyprus	46%
Czech Republic	23%
Estonia	-5%
Croatia	46%
Hungary	51%
Lithuania	50%
Malta	67%
Poland	53%
Romania	67%
Finland	23%
Slovakia	23%

Table 7 Profitability of agriculture in the European Union.

Source: Edited by the authoer based on the database of the Farm Accountancy Data Network.

Table 7 shows the profitability of agriculture in each of the 10 countries that joined the European Union in 2004, as well as Romania, Bulgaria and Croatia.

Hungary has a profitability ratio of 51 percent, which places it as the fourth most profitable country in Eastern Europe. While Zomba has a net profit margin of about 28 percent, even this modest profit margin can serve as the engine of growth for this region.

Conclusions

Through the investigation of Zomba, I found that the net profit margin for agriculture can be as high as 28 percent and a dynamic growth has been seen even recently.

Since the tourism of the entire Tolna county is rather anemic based on accomodations and their utiliziation [6], in my view, the strategy of the villages in Tolna county, such as Zomba, could be more effective if, instead of making a huge starting investment needed in tourism they would continue focus on agriculture.

It is critically important for rural areas that cannot take part in the national strategy of Hungary to develop an independent strategy.

One cannot deny that service sector is typically dominant today. But, in my view, the main reasons for this are in urbanization and the limited nature of land. In villages like Zomba, where agriculture has a considerable past and population density is low compared to larger cities, land is still a valuable resource that can provide long-term livelihoods and a solid future.

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The financing options for the Romanian SMEs in the current economic condition

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Abstract: The financing decisions, together with the investment decisions, are probably the most important financial decisions that any entrepreneur or small and medium enterprise has to adopt from the very beginning of their activity. Therefore, particular attention should be paid to different factors that are influencing the financing decision such as costs, duration, flexibility, the risk involved, control, timing and so on. In this paper, we intend to analyze the way the Romanian SMEs are financing their activities in the current economic conditions, what are their options and preferences. We also intend to make a comparative analysis of the patterns of financing of SMEs in the EU with the Romanian SMEs to observe what the similarities and discrepancies are.

Keywords: Financing, Entrepreneurship, SME

1 Introduction

In 1990 Romania started the transition process to a market economy having virtually no private companies because during the almost fifty years of communism regime any form of private initiative in business was forbidden. Therefore, the transition process was long and difficult, with many ups and downs, including painful reforms that were, sometimes, stopped and then re-initiated. Despite the lack of entrepreneurial culture and the difficult business environment, the number of small and medium enterprises (SMEs) started to grow quite consistently from the end of the last decade of the twentieth century, at a pace of 7% per year (approximately 20.000 to 30.000 units each year) until 2008 when, because of the financial crisis, this positive trend was stopped temporarily (Duma, 2012).

Following the 2008-2009 financial crisis, in order to rebalance the economy, painful fiscal adjustments were implemented in Romania in 2010, among them: cutting the salaries in the public system by 25%, freezing the pensions, increasing the VAT from 19% to 24% and so on. As a result of the financial crisis, many

Romanian SMEs went bankrupt or suspended their activities and the five survival rate dropped dramatically. For example, as we can see in the chart below (Chart no.1), if we take just the case of the very small enterprises with 1 to 4 employees, the survival rate dropped from 57.6% in 2009 to only 36.2% in 2013. Also, the number of persons employed decreased from 100% in 2008 to approximately 85% in 2010. But, even more dramatic was the drop in value added by the SMEs, from 100% in 2008 to almost 70% in 2010 and the recovery only started in 2013, as we can see from the tables below (Chart no.2).
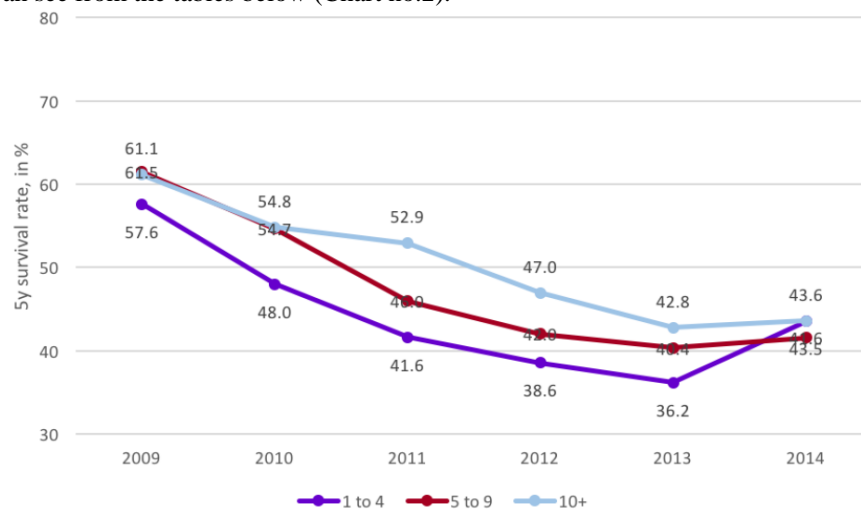
Chart 1. Romanian SMEs survival rate after the 2008-2009 financial crisis
Source: EC, 2018 - SBA

Value added of SMEs

(Index: 2008=100, estimates as from 2016 onwards)
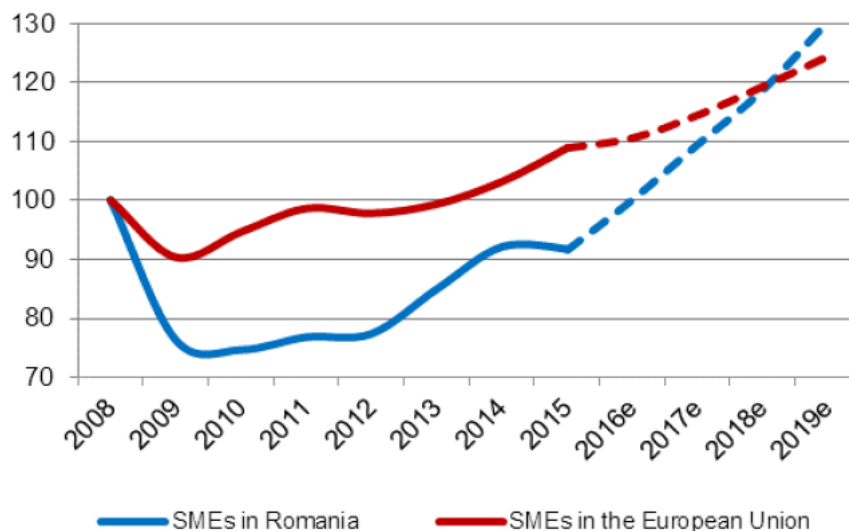
Chart no.2 Value-added of the Romanian SMEs vs SMEs in the EU
Source: (EC, 2018 - SBA)

Eventually, the positive trend started prior to 2008 was resumed some years later and while the number of persons employed in SMEs started to recover slowly, the growth of value added by SMEs was much stronger. This was possible due to the improvement in the general macroeconomic environment, but also due to specific initiatives promoted by national authorities to improve SMEs' access to finance, complemented by other tools addressing the needs of SMEs, such as loans, European Fund for Strategic Investments (EFSI) financing, guarantee funds, tax incentives, tax reductions, legislative measures, crowdfunding, business angels[2] and so on (Pop, 2018). Regarding the value added, the SMEs surpassed the 2008 level by the year 2016 and the projection for 2019 is to surpass even the EU average (see Chart no.2). This positive trend concerning the value added generated by the SMEs is partially due to the information technology and communication sector that has performed exceptionally well in the past five years, generating growth of 41.9% in value added and 22.3% in employment (EC, 2018). Today we are counting 480.791 active SMEs in Romania (EC,2018), meaning approximately 23 SME per 1.000 inhabitants, still far from the average in the European Union.

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[2] A specific law regarding the stimulation of the individual investors - business angels with fiscal incentives, was promoted in Romania in 2015, Law no.120/2015

2 Financing options available for the small and medium-sized enterprises

The financing decision is a very challenging task for any company, but especially for the small and medium-sized enterprises because they encounter more restrictions and obstacles than the large companies. Basically, a small and medium enterprise can finance its activity in four major ways:

1. Self-financing.
2. With equity by "selling rights";
3. With debt by "buying obligations";
4. Different grants and financing support schemes.

The decision to choose one of these financing ways or a combination of them depends on several factors such as availability, cost, duration, flexibility, risk, control and so on.

Self-financing generally means using the entrepreneur's own capital and resources to finance the company. Another way of self-financing is using family or friends' money or resources. We think that it is not recommendable for new entrepreneurs to get capital from the so-called "3 F" (family, friends and other fools), because they will invest money mostly because they like them, not because they analyzed the business plan (if there is one) and whether or not it is realistic. However, if the entrepreneur will eventually lose their money, very probably their relationship will also deteriorate. Self-financing might look like a simple solution but it doesn't mean that there are no costs involved, as many entrepreneurs think. Milton Friedman said once that "there is not such a thing as free lunch", they have to consider at least the opportunity cost of the capital.

On the other hand, self-financing can come in the form of using financial resources generated by its own activity. This financing option will come in the form of plowing back and reinvesting the profit, using resources generated by the operational activity, using different reserves or other sources like cash flow allocated to depreciation. Focusing on availability, this form of self-financing is not truly an option for many SMEs, especially for the start-ups and the very young enterprises, simply because they don't yet have a profit to plow-back or to make reserves. This financing option will come for these companies at a later stage, hopefully. Therefore, the real choice for these companies has to be made between equity, debt and financial grants, if available, or a combination of them.

Generally speaking, equity means "selling" rights in somebody's enterprise in exchange for capital. More precisely, the investor will get a percent of the shares with all the rights deriving from it: voting rights, dividends, decision rights etc.

This operation can be done at the very beginning or later on through a capital increase.

For the SMEs, the most common ways of financing with equity increase are: business angels, crowdfunding, venture capital, direct internet public offers etc. Family or friends can be considered equity if they get a part of the shares, but we prefer to include them in the self-financing if they only invest for personal and not for business reasons. From this point of view, business angels are a much better idea, not only because they can provide the entrepreneur with the necessary capital, but also they will give valuable feedback regarding the business. Business angels are current or former (serial) entrepreneurs or wealthy people with a lot of experience, which meets certain standards for accredited investors established by the financial supervisory authority, who can help and protect your enterprise like an "angel".

Crowdfunding is another financing tool for entrepreneurs that use small capital contributions from a large number of individuals usually trough dedicated web platforms like, for example, kickstarter.com. Another form of financing with equity is the Direct Public Offer (DPO) when the enterprise sells its shares directly to investors, usually online. The Direct Public Offers are more appropriate for SMEs than the Initial Public Offers (IPO) because they eliminate the financial intermediaries (investment banks, dealers, underwriters, etc.) and for this reason are much cheaper, lowering the cost of the capital substantially.

Venture capital is a financing option that usually comes from different types of investment funds and provides a large amount of money, but also expertise or management for the enterprise.

If equity financing is not available or enough, the other financing option is to borrow money. The debt can come in the form of bank loans, bonds or leasing.

Concerning the bank loans, the problem for the SMEs in accessing them is related to the collateral guarantees they have to provide, yet this shortcoming can be solved by leasing, either operational or financial. It might be more expensive than a bank loan and limited to just some categories of assets but is more easily available because doesn't require additional guarantees, other than the asset itself. The bonds, like the IPO, are not an option for the SMEs in Romania, first of all, because their issuance is an expensive process and, secondly, because the enterprise has to have some notoriety and good credibility.

For shorter periods of times, an entrepreneur can use some other sources of financing like payables, resources generated by the operating activity, short-term loans, overdraft loans or factoring. The advantage of these short-term financing sources is that some of them can be much cheaper and available compared to the long-term financing sources. In this category we can find, for example, the payment delay accepted by payables, customers' credit or other resources

generated by the operating activity. On the other hand, the overdraft loans or the factoring are expensive but can be very useful to cover treasury deficits.

The combination of all these financing options is called capital structure policy and should have the minimization of the cost of capital as objective, as well as the maximization of the enterprise's value.

3 The financing structure of the Romanian SMEs

Access to finance is not the most important issue for the SMEs in the European Union. Actually, this concern decreased from 16% in 2009 during the financial crisis to 7% in 2018. The top three most important concerns for SMEs in the EU are: availability of skilled staff or experienced managers (25%), finding customers (23%) and regulation (13%) (SAFE, 2018). According to the same survey, the access to finance is the main issue only for 7% of Romanian SMEs in 2018, in line with the EU average.

According to a survey presented in the White Charter of the Romanian SMEs (CNIPMMR, 2018), the top three most important concerns for the Romanian SMEs are: the bureaucracy, the hiring and the retention of skilled staff and excessive taxation (see the chart no.3). We can observe that only the issue related to skilled staff availability and retention is given in both the top three concerns reported by the SMEs in the EU and Romania.

Chart no.3 The main constraints for the Romanian SMEs in 2018

The main constraints for the Romanian SMEs (2018)

Constraint	Value
bureacracy	59,49
employees retention, skilled staff	45,97
excessive taxation	40,97
unfair competition	40,97
inflation	40,25
decrease of the internal demand	38,64
currency fluctuation	36,67
incresing salaries	32,92
coruption	31,31
weak infrastructure	29,7
delays from receivables	27,73
expensive loans	23,43
excessive controls	22,9
imports competition	22,54
unpaid governmental bills	17,35
difficult access to loans	17,17
difficult acces to consultancy and trainings	16,82
decrease of the external demand	14,31
adoption of the aqui	8,41
others	0,18

(source: CNIPMMR, 2018)

However, even though the access to finance is not mentioned as a major concern, neither for the Romanian SMEs, nor for the SMEs in Europe, we believe it is valuable to check what financing options they have available and if they differ significantly.

Source	relevant	recently used
Equity capital	12%	2%
Other loans	20%	8%
Internal funds	26%	15%
Grants	32%	8%
Trade credit	33%	18%
Bank loans	47%	17%
Leasing	47%	24%
Credit lines	52%	35%
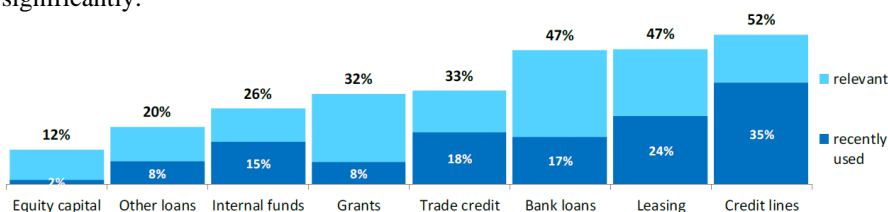
Chart no.4 The relevant sources of financing for the SMEs in the European Union
(source: SAFE, 2018)

As we can see from the chart no.4, the top three most relevant sources of financing for the SMEs in the European Union are credit lines, leasing and bank loans. We can observe that the financing with debt from a bank or from a leasing company is the relevant financing option for most of the European SMEs. Even in fourth place we still find another form of debt financing, not with a bank this time, but with payables, as well as in seventh place where other loans are indicated. Therefore, it is easy to see a very clear preference of the SMEs in the EU for debt

financing. We think this is because, on the one hand, it is more available and, on the other hand, the capital markets in the EU are not developed enough or its instruments are not suited to the needs of the SMEs. As a matter of fact, the capitalization of the stock markets from the EU is only at 75% of the GDP, while in the US it represents 136% of the GDP. But, the banking sector is more developed in Europe where the bank credit to the private sector is 104%, whereas in the US the bank credits account only for 43% of the GDP (FESE, 2014). Basically, most of the financing in the EU comes from the banks, creating so-called 'bank-centric' Europe. Only 30% of the financing comes from the stock markets in the EU compared to 70% in the US. Moreover, bank finances are four times bigger than the GDP in the EU, while in the US they amount to only 80% of the GDP (Duma, 2016). Regarding the SMEs in the EU, the percentage is even smaller, equity financing being relevant for just 12%.

Financing structure of the Romanian SMEs provides a more complicated picture, as we can see in the chart no.5 elaborated on a survey made by CNIPMMR in 2018, presented in White Charter of the Romanian SMEs.

Financing structure of the Romanian SMEs (2018)
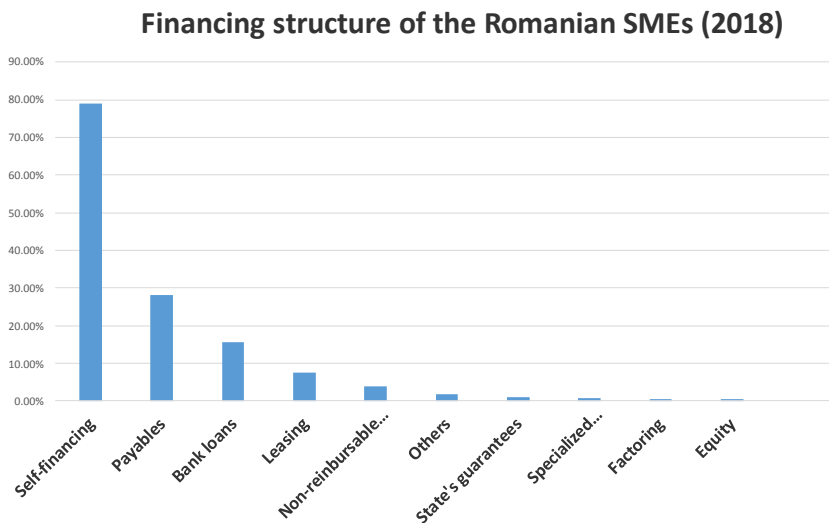
Chart no.5 Financing structure of the Romanian SMEs in 2018
(source: CNIPMMR, 2018)

Quite surprisingly, we can find that almost eight out of ten SMEs in Romania are using self-financing as the main way to finance their activities. In second place, but very far behind, comes the payables which are not even a proper source of financing, in the sense that nobody is lending money, just accepting (though not always voluntary) a delay regarding payments due. Moreover, this is just for short-term and, often, only an emergency solution to cover a cash flow deficit.

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Only in third and fourth place, but with a very small percentage, can we finally find some similarities with the SMEs in the EU, namely the financing with the bank loans and the leasing. There is a little similarity in the ranking (in Romania bank loans and leasing are in third and fourth place, while for the SMEs in EU are in third and second place), but not at all in percent. While for the SMEs in the EU leasing is accounts for 47% of the SMEs and there is a similar percentage for the bank loans, for the Romanian SMEs the bank loans represent only 16%, and the leasing even less, just 7.5%. One reason for these low percentages is that the interest rates are much higher in Romania compared to other countries in the EU and, another reason is that the banks there are quite reluctant to credit the SMEs because of past experiences with high rates of non-performing loans. Moreover, the banks are asking for collateral guarantees that most of the Romanian SMEs cannot provide. In fact, most of the banks in Romania have an ultra-precautionary approach regarding the financing of the SMEs. Therefore, it should not come as a surprise that the level of financial intermediation in Romania is the lowest in the EU, reaching just 52.2% of the GDP, four-time less than the median in the EU where it is at 208% of the GDP (Voinea et all, 2018, p.101).

Also, despite big publicity and many talks, the non-reimbursable funds from the EU or the different grants account for only around 5% for the Romanian SMEs, while in the EU these grants are relevant to 32% of the SMEs. An explanation can be the problem in bureaucracy that was indicated as the principal constraint for the Romanian SMEs in general in 2018, but also the long duration of the whole process and the fact that the entrepreneurs and the SMEs don't know how to approach or deal with these funds.

The same discrepancy is found in equity financing, which is virtually non-existent in Romania (0.5%), while in the EU, though this percent is small compared to the US, it's still 24 times bigger than in Romania.

We can easily observe that many financing sources are very minimally represented or are missing completely from this picture of the financing structure of the Romanian SMEs, like for example: business angels, crowd-funding, grants, venture capital, IPOs, equity in general. We think this is because many entrepreneurs don't have a feasible business idea, don't know how to present it or don't know how to elaborate a proper business plan to get the appropriate financing.

Conclusions

The picture of the financing structure of the Romanian SMEs in 2018 appears strongly unbalanced, with the great majority of the SMEs having self-financing as their first option for financing. Unfortunately, very often this self-financing happens not by choice, but because of necessity, being the only available solution, this originating in 39% of the companies in Romania having negative capitals

(Voinea et all, 2018), so are rather underfinanced. If we add to this the fact that the second source of financing for the Romanian SMEs is the payables, we have a picture of companies that are financing for survival, not for organic development. Moreover, if we are looking at the most relevant sources of financing for the SMEs in the EU, we can observe that each of them account for less than 15% in the case of the Romanian SMEs.

Actually, this extremely high percentage of self-financing shows a situation of subsistence organizations (Gheorghiu & all, 2015, p.16), indicating a form of subsistence entrepreneurship in general, that doesn't have many chances of real development without enough and adequate financing.

In order to rebalance the situation and to foster the development of the SMEs, we believe that first it would be necessary to create a more favorable ecosystem for entrepreneurship in Romania and then the money will follow creative and feasible business ideas presented on logical and realistic business plans. Everything should start early with entrepreneurial education in schools at every level: primary (children can play different types of Monopoly games, for example), secondary, high schools, universities, but also outside schools with training for actual or potential entrepreneurs. The next step should be the development of a better infrastructure including business incubators, accelerators, co-working spaces, innovation labs and so on, to help the entrepreneurs and the companies at their early stage. And, of course, even after "take-off" continuing to provide support in the form of counseling, mentoring or business coaching would help these entrepreneurs and SMEs in their development.

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Regional competitiveness in the European Union: The role of individual and institutional factors

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Abstract: While it is generally believed that the basic unit of territorial competitiveness is the firm, existing country level and regional competitiveness measures focus on the widely interpreted institutional aspects of competitiveness and neglect individual (firm) level characteristics. The theoretical concepts are also separated. One can find institutional and individual theories, but they are not related to each other. Popular competitiveness indices are based on institutional factors. Reflecting to this contradiction, we have created a new index that combines institutional aspects and individual competencies in a systemic way to measure regional competitiveness more correctly (highlights SME sector).

1 Introduction

Nowadays, competitiveness researching has becoming increasingly popular. Only a few focus on assessing the competitiveness of the small and medium-sized

enterprise sector and even less with its regional dimension. While Porter and Krugman debate the importance and the validity of competitiveness, they both agree at firms (individual) level competition is the basis of territorial or national competitiveness [17][13]. At the same time, existing theories and competitive measures focus on the institutional setup/context [1][8][11].

However, the links between individual and institutional components of competitiveness are still missing. At the national level, Porter's diamond model is the most widespread, that is based only on institutional factors. Similarly, institutional based factors dominate regional competitiveness concepts [11][12]. Porter's five force model is still a dominant theory of examining industry level competitiveness. However, this approach is mostly appropriate for large firms where resource constraints are not binding [17]. Finally, at the firm's level, resource-based view theory based on individual competencies is the most useful [3]. A popular tool to identify firm level individual (inside) and environmental factors is the SWOT analysis. However, SWOT is lacking a comprehensive framework and general methodology; consequently all cases are unique and non-comparable.

So realizing this incompleteness, we have created a new index, CRCI (Combined Regional Competitiveness Index), to combine the regional level (institutional data) and the individual level (firm data) to measure regional competitiveness more correctly.

2 The concept of regional competitiveness

Competitiveness can be examined from many perspectives. In this study, we only focus on territorial, regional aspect.

Territorial, and thus regional competitiveness definitions are basically output-oriented. A region is more competitive than another if its regional output is higher than the other region. Output is primarily measured along the per capita GDP, growth, unemployment, productivity, and value-added indicators. In addition, the general well-being, prosperity, and sustainability of the people in the area are often included in the definitions [5][12][14]. From another dimension, a region with high-growth companies that are capable of attracting and retaining creative and highly qualified people as well as external investors [7][9][15] is also viewed as competitive.

Regional competitiveness differs from national approaches in two respects:

1. Absolute advantages/disadvantages are more important than the relative ones since at the regional level there is only limited scope for adjusting absolute cost differences [6].

2. Regional competitiveness cannot be interpreted as spatial degradation of national competitiveness or as the level of productivity of enterprises. Instead, successful regional competition is characterized by a kind of open "flow space". In order to attract and retain production factors, "sticky places" [16] are, becoming the centers of trade, investment and knowledge flow [10].

Consequently, the region's competitiveness depends to a large extent on its ability a favorable entrepreneurial, institutional, social, technological framework and infrastructure to provide "external benefits" to local firms [6][4]. In other words, regional competitiveness is a "dual concept that explains relative differences in rates of economic development across regions, as well as an understanding of the future economic growth trajectories of regions at a similar stage of economic development" [9 p. 28].

3 Empirical Research

3.1 Combined Regional Competitiveness Index

While it is believed that firms (individual) level competition is the basis of territorial competitiveness, existing theories and competitive measures focus on the institutional context [1][8][11]. We have created a competitiveness index, called the Combined Regional Competitiveness Index (CRCI) that interacts the firms' individual competencies and the regional institutional factors in a systemic way. CRCI is calculated for a mix of NUTS 1 and NUTS 2 level 151 European Union regions.

Table 1 shows the structure of the index. The new index comprises four sub-indices, ten pillars and 20 variables each representing a different aspect of regional competitiveness. The intensity of competition sub-index reflects two types of competitive pressure one that is coming from existing businesses and the other is deriving from new entry. New firms can have two influence on is the increase of the number of new firms (Kirznerian entrepreneurship) and the other is to be more innovative as the existing businesses (Schumpeterian entrepreneurship). Growth and internationalization strategy includes the firms' generally interpreted growth and international aspirations. In the Human capital sub-index, we incorporate the businesses' level of education and training and the entrepreneurial abilities of the leader of the business. The Innovation sub-index reflects the firms' renewal capabilities. It measures the ability to create new technology, new product, and how firms can absorb existing technology.

Table 1 Combined Regional Competitiveness Index (CRCI)

Institutional variables		Individual competencies	Pillars	(Sub-index)	Index
Business sophistication	x	Schumpeterian e'ship	Innovative pressure	Intensity of competition	Combined Regional Competitiveness Index
Institutions	x	Kirznerian e'ship	New firm creation capacity		
Competition regulation	x	Competitors	Competitive pressure		
Finance	x	Gazelle	Finance and Growth	Markets	
Macroeconomic stability/employment	x	Export	Internationalization		
Higher education & lifelong learning	x	Educational Level	Knowledge capacity	Human capital	
Population ICT readiness	x	Individual Capabilities	Entrepreneurial capital		
Accessibility	x	New technology	Technology transfer	Innovation	
Innovation capacity	x	New product	Product innovation		
Technology absorption capacity	x	High impact sectors	Technology absorption		

3.1.1 Sample, variables, and methodology

The data used in this study come from three sources. First, our firm-level individual variables are from the Global Entrepreneurship Monitoring (GEM) adult population survey including young/baby businesses and established firms. Data are available for 24 European Union countries, 151 regions, a mix of NUTS 1 and NUTS 2 regions from 2010-2014. Second, institutional variables are mainly from Annoni's Regional Competitiveness Index (RCI) dataset (Annoni 2016). Third, the rest of our study variables, such as information GDP per capita, GVA per worker and population density at the regional level, was obtained from the statistical office of the EU (Eurostat).

The CRCI index, as I mentioned above, incorporates four sub-indices, 10 different pillars, 20 variables – half institutional and half individual – and 46 indicators. Indicator selection was based on:

- the theoretical and empirical literature search to be able to connect the indicator to the competitiveness phenomenon,

- their potential to assign clear benchmarks and evaluate performance in relation to this benchmark,

- their capabilities to connect to economic development, and

- the availability of data over the examined time period, 2010-2014.

In the index building methodology, we follow Acs, Autio and Szerb [2].

3.2 Results

3.2.1 Correlation table

As a first step, we examined the tightness and direction of the relationship between the pillars of the model, the pillars and the CRCI, and the pillars and GDP per capita. As can be seen in Table 2, there is a positive relationship between each pillar, indicating that they belong to the same concept. The KMO (0,87) and the Bartlett test sphericity (p=0,001) both reinforce that our index is a proper construction. For CRCI we can see that all pillars correlate positively and significantly with the index at 1% significance level, In addition, there is a positive correlation between the pillars and the GDP per capita. The explanatory force is basically the right size.

Table 2 Correlation table of the ten pillars and of the CRCI

	1	2	3	4	5	6	7	8	9	10	11	12
1 Per capita GDP average 2010-2014	1	,772**	,603**	,524**	,364**	,649**	,338**	,616**	,677**	,466**	,674**	,715**
2 Combined Competitiveness Index Score		1	,650**	,830**	,658**	,750**	,506**	,801**	,893**	,548**	,775**	,783**
3 Innovative pressure			1	,465**	,361**	,512**	,160*	,416**	,596**	,328**	,339**	,501**
4 New firm creation capacity				1	,696**	,529**	,308**	,670**	,731**	,360**	,590**	,544**
5 Competitive pressure					1	,426**	0,11	,546**	,591**	,223**	,439**	,325**
6 Finance and Growth						1	,255**	,562**	,630**	,531**	,470**	,636**
7 Internationalization							1	,256**	,466**	,174*	,390**	,350**
8 Education								1	,736**	,282**	,701**	,664**
9 Entrepreneurial capital									1	,322**	,660**	,658**
10 Technology transfer										1	,399**	,396**
11 Product innovation											1	,641**
12 Technology absorption												1

Note: ** significant at 1% level, * significant at 5% level

3.2.2   A map of CRCI scores

As a second step, we have created a map that shows the geographic distribution of CRCI scores across the European regions. The most competitive regions, as shown in Figure 1, are the regions of Denmark, of the United Kingdom, Sweden, France, and Germany. As expected, large mainly capital cities and surrounding areas are more competitive then less developed rural regions. The Polish, Czech, Slovak, Finnish, Baltic and Italian regions performance are about on the average. The Hungarian regions are located in the back segment of the list, on the same level as the Romanian and the Spanish regions. At the end of the list, it is not surprising there are the Greek regions.
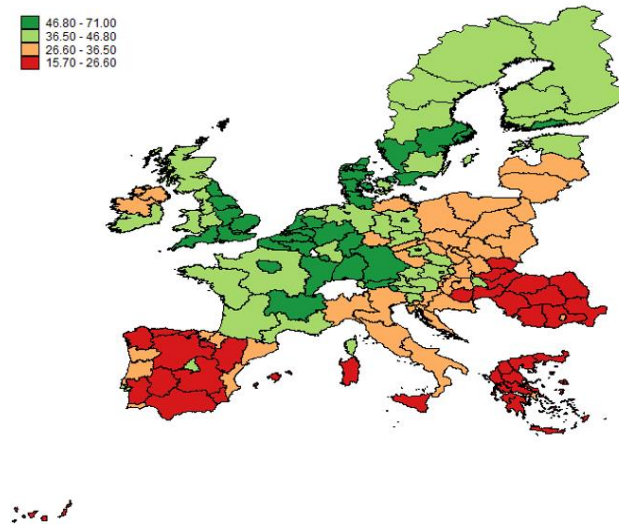
Figure 1

Geographic distribution of CRCI scores across European regions

3.2.3   Results of cluster analysis

The third step was to perform k-means cluster analysis to identify groups with similar characteristics. The analysis shows that three groups of the 151 EU regions prevail wide varieties of competitiveness profile based on the ten pillars of competitiveness. As can be seen in Table 3, Cluster 1 members perform best on almost every pillar. Members of Cluster 2 only rise in the pillar of export and innovation, otherwise they are average performers. Cluster 3 members perform the worst in each pillar.

Table 3 Results of cluster analysis of 10 competitiveness pillars

	Cluster		
	1	2	3
Innovative pressure	,491	,430	,257
New firm creation capacity	,652	,385	,205
Competitive pressure	,576	,376	,254
Finance and Growth	,468	,410	,285
Export and Innov. cap.	,388	,500	,258
Education	,546	,398	,253
Entrepreneurial capital	,577	,451	,195
New tech. and Accessibility	,517	,354	,303
Product innovation	,495	,417	,265
Technology absorption	,480	,439	,256

In the second map (Figure 2), you can see results generated by k-means cluster analysis. The results are so similar to the previous map, but the differences are more pronounced here.
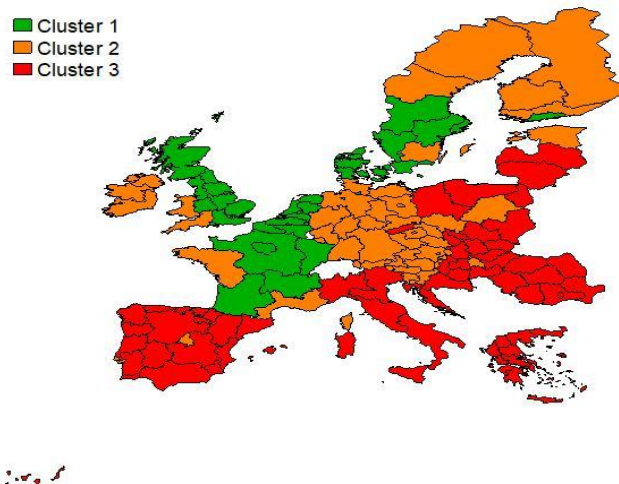
Figure 2 Clusters of European regions based on the 10 competitiveness pillars

3.2.4 Models, results of OLS regression analysis

In the following we are examining how the CRCI and its components explains the level of development and of growth. In particular, we are interested how the individual and institutional factors contribute to explaining the economic performance of the EU regions.

In Model 1, we examine the effect of the complex CRCI on regional performances. Our dependent variables are logarithmic GDP per capita in Model 1a, the logarithmic Gross value Added (GVA) per worker in Model 1b, and GVA per worker growth in Model 1c. Control variables are GDP per capita (average 2010-2014, in PPS), the population density, the average number of employees per company in the region, the capital dummy and the country dummies.

Model 1:

a) GDP per capita$_i = \beta_0 + \beta_1$ CRCI$_i + \beta_2$ Controls$_i + \varepsilon_i$

b) GVA per worker$_i = \beta_0 + \beta_1$ CRCI$_i + \beta_2$ Controls$_i + \varepsilon_i$

c) GVA per worker growth$_i = \beta_0 + \beta_1$ CRCI$_i + \beta_2$ Controls$_i + \varepsilon_i$

In the second model, the focus of the analysis is the impact of individual and institutional factors. Similar to the previous case, our dependent variable is the logarithmic GDP per capita in Model 2a, the logarithmic GVA per worker in Model 2b, and GVA per worker growth in Model 2c. Our control variables are the population density, the average number of employees per company in the region, the capital dummy, and the country dummies.

Model 2:

a) GDP per capita$_i = \beta_0 + \beta_1$ Individual variables$_i + \beta_2$ Institutional variables$_i$ $+ \beta_3$ Control variables$_i + \varepsilon_i$

b) GVA per worker$_i = \beta_0 + \beta_1$ Individual variables$_i + \beta_2$ Institutional variables$_i$ $+ \beta_3$ Control variables$_i + \varepsilon_i$

c) GVA per worker growth$_i = \beta_0 + \beta_1$ Individual variables$_i + \beta_2$ Institutional variables$_i + \beta_3$ Control variables$_i + \varepsilon_i$

The following three tables (Table 4, Table 5 and Table 6) present the results of OLS regression analysis. It shows, there is a positive, significant relationship between CRCI and regional GDP performance. The CRCI effect on the regional

GVA is also positive, and significant. It shows that the regional employment rate of CRCI has a positive effect on the GVA per employee in the given region.

The results are slightly different when we look at separately the effect of individual and institutional factors. It seems the both factors are only significant in the GVA per employee model. However, the sign of the influence is negative in the case of individual factors and positive in the case of institutional ones. For GDP per capita and the GVA per worker growth, only institutional factors have a significant positive effect. The results are slightly paradox when we view the GVA per worker growth, where CRCI negatively influence this indicator.

Table 4 Results of the OLS model, dependent variable GDP per capita

	In GDP per capita PPS (2014-2016)	
	Model 1a	Model 2a
Individual factors	0.2568 (0.2759)	
Institutional factors	2.3070 (0.1802)***	
CRCI		0.0255 (0.0023)***
ln Population density (2010-2014)	0.0419 (0.0171)**	0.0259 (0.0215)
Employment per local unit (2010-2014)	−0.0064 (0.0030)**	−0.0009 (0.0029)
Capital dummy	0.1506 (0.0490)***	0.1191 (0.0570)**
Country dummies	Yes	Yes
Intercept	8.5610 (0.1539)***	9.0410 (0.0828)***
F – test	49.65***	51.01***
R2 (adjusted)	0.8458	0.8095
RMSE	0.1454	0.1617
VIF (min – max)	1.82 (1.10-4.24)	1.68 (1.09-4.69)
Observations	144	144

Note: *** significant at 1% level, ** significant at 5% level, * significant at 10% level

Table 5 Results of the OLS model, dependent variable GVA per worker

	In GVA per worker (2014-2016)	
	Model 1b	Model 2b
Individual factors	−2.0574 (0.4586)***	

Institutional factors	2.0974 (0.3146)***	
CRCI		0.0141 (0.0050)***
ln GDP per capita (average 2010-2014, in PPS)		
ln Population density (2010-2014)	0.0350 (0.0217)	0.0124 (0.0357)
Employment per local unit (2010-2014)	−0.0031 (0.0040)	0.0053 (0.0041)
Capital dummy	0.0306 (0.0654)	−0.0475 (0.0925)
Country dummies	Yes	Yes
Intercept	3.7659 (0.2918)***	3.2915 (0.1577)***
F – test	123.61***	255.93***
R2 (adjusted)	0.8131	0.7715
RMSE	0.2050	0.2267
VIF (min – max)	1.82 (1.10-4.24)	1.68 (1.09-4.69)
Observations	144	144

Note: *** significant at 1% level, ** significant at 5% level, * significant at 10% level

Table 6 Results of the OLS model, dependent variable growth of GVA per worker

	Growth of GVA per worker (2014-2016)	
	Model 1c	Model 2c
Individual factors	0.0109 (0.0556)	
Institutional factors	0.1213 (0.0574)**	
CRCI		0.0006 (0.0007)
ln GDP per capita (average 2010-2014, in PPS)	−0.0153 (0.0203)	0.0043 (0.0177)
ln Population density (2010-2014)	0.0042 (0.0031)	0.0035 (0.0030)
Employment per local unit (2010-2014)	−0.0008 (0.0006)	−0.0003 (0.0005)
Capital dummy	0.0004 (0.0101)	−0.0021 (0.0101)
Country dummies	Yes	Yes
Intercept	0.0974 (0.1715)	−0.0530 (0.1576)
F – test	3.21***	2.55***
R2 (adjusted)	0.3230	0.3058
RMSE	0.0332	0.0336
VIF (min – max)	2.46 (1.13-9.41)	2.15 (1.12-8.25)
Observations	144	144

Note: *** significant at 1% level, ** significant at 5% level, * significant at 10% level

Conclusions, further research opportunities

Our study presents a new index, called Combined Regional Competitiveness Index (CRCI), measuring the competitiveness of 151 European Union regions.

The aim of the new index is to explain differences in economic growth. The cluster analysis shows that the three groups of the 151 EU regions prevail a wide varieties of competitiveness profile based on the ten pillars of competitiveness. The regression analysis shows that the regional employment rate of CRCI has a positive effect on the gross added value per employee in the given region. Overall, we can conclude that the new index is quite accurate in measuring regional competitiveness. We can find that CRCI scores explain regional growth both in terms of value added and employment. The outcomes of institutional aspect are consistent, but the individual results are not convincing. There are some potential explanations about the reason of this finding. Maybe some regions have specific features that condition the studied relationship. In the future, it is worth examining whether there is a structural break in the data. It is also worth paying attention to spatial diagnostics.

Acknowledgement

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The impact of cloud computing on business - IT strategic alignment

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Abstract: Research has shown that Information Technologies (IT) can be a source of competitive advantage for companies and can improve company performance. However, researchers have also found that not all IT investment leads to increased competitiveness and improved company performance. That phenomenon has been named as the 'IT Paradox'. One of the main reasons for the IT paradox is the missing strategic alignment between the business units and the IT department of the firm. Since the first decade of the 21st century, a new phenomenon, 'cloud computing' changes the way companies use IT. Instead of building own IT systems, companies can use IT as a service, from external providers. That new way of IT consumption also impacts the alignment between the business units of the firm and the IT department. In this paper, we analyze the impact of cloud computing on the strategic alignment between business and IT. We conclude that cloud computing changes the role of the IT department and the use of cloud services can improve the strategic alignment.

Keywords: Business – IT Alignment, Cloud Computing, Cloud Services

1 Introduction

Strategic alignment between business and the IT department has been widely researched for nearly four decades. To address this complex problem, Henderson and Venkatraman have developed the Strategic Alignment Model [1] in 1989. Since then, IT has become even more important for companies and institutions. In 2007, 87 percent of managers believed that IT is critical to their company's success [2].

During the '90s several studies tried to understand the linkage between use of IT and company performance and prove that increased investment into IT systems results in superior company performance. Company executives also share the view that IT is critical to overall company success [3].

However, research showed inconsistent result. While several studies showed positive correlation between IT investment and company performance [4-7] in many cases increased IT investment did not improve the company performance [8-10]. That phenomenon has been named as the 'IT Paradox' [11].

Scholars have offered two explanations for the IT paradox [11]:

1. IT investment is not always aligned with organizational goals, strategy, resources or capabilities

2. The value of IT investment has not been captured properly by the studies. The real value of IT investments can be difficult to measure, for example in case of increased customer value.

The first is the more commonly mentioned reason and highlights the importance of alignment between the business functions and the IT department. Research shows that IT can contribute more to the company performance if IT is aligned with the business strategy [7, 12-16].

Moreover, IT can not only support the business strategy but can influence and lead it as well [17]. Oh and Pinsonneault find that "High-end strategic alignment (i.e., fit occurring when business strategy and IT strategy are both high) leads to superior performance compared to low-end strategic alignment (i.e., fit occurring when business strategy and IT strategy are both low)" [18]

Despite the understanding of its importance, business-IT alignment remains a top concern for IT executives and an area of interest of researchers [16, 19]. Based on several surveys during the past decades, alignment is always amongst the top concerns, in many cases, this is the #1 concern of the Chief Information Officers [20].

2 Reasons for Sub-optimal Alignment

Based on the existing literature, the reasons for sub-optimal business-IT alignment can be organized into three categories.

First, the IT department and the business leaders do not understand each other' domains [21]. Often they are unable to express themselves in common language, explain their goals and complexities. To achieve sustained alignment, they need to engage in a continuous discussion and coordinate their efforts. CIOs should actively put effort into improving the alignment; they should participate in business meeting and achieve a better understanding of business priorities. They should also educate management about the possibilities of IT and how competitors use IT [22].

The value of discussion and creating common understanding appears to be asymmetric. Kearns and Lederer suggest that the CIO's participation in business planning has a more positive impact on the alignment than the CEO's participation in strategic IT planning [22].

The second reason is that in the today's rapidly changing environment business requirements are subject to frequent change. Sometimes it is a result of conscious change, but sometimes it is due to unforeseen happenings, failed promises and human errors [21]. Business users often learn during the project what are the possibilities and they change the requirements for the IT system. As a result, a gap opens between the stated objectives at the conception of the project and the requirement during and after execution. Therefore, alignment should not be considered as a 'state' but "a journey that does not unfold in predictable ways" [21, p:285].

The third reason is the lack of flexibility of IT systems [21]. IT systems create a complex architecture, where different layers built on each other and must work together seamlessly. To change a specific application in the complex architecture may require significant development.

For example, if the company servers are used at the near maximum of their computing capacity, users can experience a slower response. IT needs to increase the server capacity, but financial resources may not be available for that. Even if the financial resources are available, the server room can be too small, so an additional room must be built with specific requirements for electricity, network connection, and air conditioning. This can be time-consuming. In this situation, when a business unit requests a new, relatively simple application, IT may answer that they will accommodate the request after the new server room is built and new server installed - in 6 months. That timeframe may be unacceptable for business users. Rapidly scaling up IT capacity to support the growth needs of a business unit can be an unattainable task for IT.

Moreover, companies usually have several IT systems working together in a complex integrated environment. Those systems were not built in a strategically planned manner; the development rather followed the uncoordinated request from different business units [23]. Some IT systems may even come from an acquired company and do not fit into the existing architecture at all.

When changing a specific application in the complex architecture, the IT department may need to modify several other applications too, which can be complex, costly, and time-consuming effort.

It is possible to reduce the complexity of organically grown IT systems, lower the number of customizations, streamline and standardize the IT systems, but it requires large upfront investment, which is often unacceptable for companies [23].

3 Cloud Computing

Traditionally, companies owned the IT systems they used. They built their own data center, purchased the hardware (servers, storage) and software components for different layers of the software architecture, and developed customized solutions according to their business needs. The IT systems were usually installed within the premises on the customer. Hence this is called the on-premise model.

During the past decade, a new way of using IT has emerged as disruptive innovation [24, 25]. Due to newly developed IT technologies (such as virtualization) and availability of high speed, reliable internet connection, consumers do not need to have their own IT system; they can use IT as a service. This model is called 'cloud computing' [24, 26-28]. In the new model, consumers (both companies and private users) become subscribers of cloud service providers. [29]

For a consumer, using cloud computing services is like using electricity [26]. When we plug an appliance into an outlet, we do not care how is the electricity generated and transferred to us. Simply, we just use the service of the complex electric power grid, and we pay for the consumption.

Cloud providers install their own data centers which include the necessary hardware and software parts to provide the service. Multitenancy is a key concept of cloud services, where several clients are served by the same hardware and software components.

From deployment point of view, when the services are provided for the general public, it is called 'public cloud'. There are also 'private clouds', which are built for a specific set of users, such as a company, organization, or government entities in a given country. There is a possibility to use a part of public and a part of private cloud for a complex architecture; this deployment model constitutes the 'hybrid cloud' [30, 31].

There are three main service models of cloud services: [28, 32, 33]

- Infrastructure as a Service (IaaS) – the cloud provider provisions to the customer fundamental hardware services, such as server capacity and storage. Consumers have their own choice to run operating system, database and application software based on their preference. In that model, consumers must own (or have the right to use) the software elements they install on the provisioned hardware service, this is not part of the cloud service.

- Platform as a Service (PaaS) – the cloud provider provisions the hardware services and basic software modules (such as operating system, database system, middleware) to the consumer, and the consumer runs its own business application on the top of that stack.

- Software as a Service (SaaS) – the cloud provider provisions business applications service to the consumer (for example, ERP, HR, Recruitment, CRM or Purchasing). This service includes the underlying hardware and software layers as well, seamlessly to the consumer.

The key advantages of cloud computing [29, 31, 34-37]:

- Subscription based service does not require a large upfront investment. Services are paid as an operational expense (Op-ex), not from Cap-ex

- Service can be scaled up and down rapidly, based on the need of the consumer needs

- Lower barrier to innovation

- The complexity of IT systems moves from the consumer to the cloud provider.

4 Analysis of Business - IT alignment using Cloud Services

In cloud computing, part of the IT related tasks is transferred from the consumer's IT department to the cloud provider [38]. This has an impact on the role and responsibilities of the consumer's IT department. This modification of the role of IT department may have an impact on the business – IT alignment. In our analysis, we seek answer to the research question: how does cloud computing changes the strategic alignment between business and IT?

4.1 Methodology

As described earlier, researchers identified three key reasons for problematic IT-Business alignment [21-23]. Those reasons are:

- Lack of understanding each other's domains

- The expressed need of business keeps changing

- IT systems are not flexible enough to support the changing need of business

To answer the research question, we analyze what impact of cloud services on the three listed reasons and examine what the impact of the cloud on those problematic areas is. We conduct the analysis for the different cloud service models (IaaS, PaaS, SaaS) for each of the three reasons. Our analysis is based on a thorough review of the existing literature and deep understanding of cloud computing through industry experience.

4.2 Lack of Understanding Each Other's Domains

4.2.1 Impact of IaaS and PaaS

Traditionally, purchasing and installing hardware elements, operating system, database, and middleware software was the task of IT department. Those are the IT functions which can be covered by IaaS and PaaS cloud service. When those tasks are transferred to the cloud service provider, IT department remains in charge of those services from the company side as the key client [39].

The shift from on-prem to cloud does not have a direct impact on how the IT staff understands the business requirements of the functional users (HR, Finance, Customer Service, etc). The use of IaaS and PaaS cloud service instead of on-premise itself does not improve the (lack of) understanding of the business needs by the IT staff and vice versa.

The use of IaaS and PaaS can, however, have a long-term impact on how the IT staff understands the business. When part of the technical tasks is transferred to the cloud provider, the roles within the IT department can be reassigned, and the IT staff can focus more on strategic and business-related issues [29, 34, 36]. In the cloud environment, the role of the IT department is changing, from managing the technology platform to become a collaborative partner of the business [40]. Instead of losing its importance in the company's operation, IT becomes a strategic partner of the supply chain, marketing and service operations which are using cloud-based solutions [41]. With reassigned roles, a 'collaborative partner' IT should have a better understanding of the strategy and goals of functional units, therefore improve the understanding of the business domain.

An example of the IT organization becoming a collaborative partner of the business is the financial firm Capital One. They moved the on-premise IT colutions to cloud by using IaaS and PaaS, and this change allowed the IT organization to work more on customer related business solutions. As George Brady Executive Vice President and Chief Technology Officer of Capital One said: *"The most important benefit of working with AWS (a cloud vedor) is that we don't have to worry about building and operating the infrastructure necessary to do that and can instead focus our time, money, and energy on creating great experiences for our customers"* [42].

4.2.2 Impact of SaaS

The key clients of SaaS services are the business users [39]. When purchasing an ERP, HCM (Human Capital Management), recruitment or marketing solution, business users can articulate their needs and engage in direct discussion with the cloud supplier, who has experts with business knowledge on the specific solution field. For example, the cloud provider's experts can explain to the HR manager

the functions of their HCM SaaS solution, and what are the experiences with other customers. This type of discussion can happen in on-premise environment as well, but, in case of an on-premise solution, the IT department must be involved into the discussion to provide IT infrastructure and integration for the business application. In cloud environment business users can order SaaS service directly from the cloud provider and use those in self-service mode [39], they do not necessarily need to ask services from the company's IT department. Therefore, business users can bypass company IT, and order business application as a service (SaaS) from a cloud provider directly [43]. In this case, understanding each other's domain between the IT department and business becomes irrelevant.

The SaaS application may need to work together with the existing systems of the customer, and this requires cooperation from the IT department. In that case, the IT department can only partially bypassed.

Partially or fully bypassing the IT department can speed-up the purchasing process and eliminate the need for explaining the business needs to IT experts who may not understand the business. This can be beneficial for the business; they can get access to business applications faster.

One of the largest Central European company's talent recruitment project was a good example of a situation when the business user department was working directly with the cloud vendor, bypassing the IT organization. The company's HR department was looking for a business soluiton to advertise open positions on their portal, accept CVs and manage the talent selection process on a digital platform. The project was succesfull, it was delivered on-time and on-budget and fully met the customer's expectations. The interviews we conducted with the cloud vendor and the customer revealed, that the success of the project largely relied on the direct communication between the HR management and recruitment specialists of the customer company and the functional experts of the cloud vendor. As Istvan Moczo, Consulting Director of Oracle explained "our business experts were working with the customer's business experts, and they understood each other very well. There was little involvement of the IT department".

4.3   The Expressed Need of Business Keeps Changing

Business needs may change during an IT project due to the change in the competitive environment [21]. Also, business users may realize during the implementation project that the IT solution can deliver additional value for them with extensions or customization, and as a result they may change the requirements. In such situation, IT is 'shooting to a moving target'. For example, business may ask to include more data sources into the solution, integrate the solution with other applications, or customize the built-in business process to better map their existing workflow. This process extends the scope of the IT

project and may require additional resources such as increased implementation budget, additional hardware, and software elements.

Even if the increased budget is available, the on-premise IT system may not be flexible enough to accommodate the required changes short term. For example, increasing the hardware capacity may require a longer time than it would be acceptable for the ongoing project. Therefore, the changing needs of the business users may not be fulfilled within the required timeframe, and this can negatively impact the business-IT alignment.

4.3.1 Impact of IaaS and PaaS

Using IaaS and PaaS cloud service makes the IT system more elastic and allows to rapidly scale up and down. With IaaS and PaaS, the IT department can respond to the changing need of the business better than with on-prem environment, therefore the alignment can improve.

4.3.2 Impact of SaaS

Increased elasticity also applies to SaaS solutions. However, SaaS has another aspect which can help to limit the customization required by the business users. Cloud providers offer limited customization options for their SaaS business applications [29, 39]. The public cloud SaaS model is based on provisioning standardized solution to large number of consumers with minimal customization. Limited room for customization does not allow the business users to keep changing the requirements; they have to accept the standard solution.

There is a trade-off between implementation time (and cost) and functionality. Accepting standard solutions may lead to shorter implementation cycle, however, the result may not be fully in-line with what the business users want or need. The market success of SaaS solutions shows that a large portion of customers is willing to accept standardized solutions in exchange for rapid and less expensive implementation.

Cloud providers can also influence the customer needs by sharing best practices and experiences with other customers. This can help business users to realize their latent needs earlier during the implementation process or give up requirements for unnecessary features.

Overall, using cloud-based business applications (SaaS) can have a positive impact on preempting and limiting the change of expressed business needs.

4.4 IT Systems Are Not Flexible Enough to Support the Changing Need of Business

The limited capability of the on-prem IT infrastructure a key reason for the inflexibility of company IT systems. The cycle of allocating financial resources, run the procurement process and implement the new hardware or software parts may take a long time. That long cycle can be seen by business users as inflexibility and lack of ability to address the business needs.

4.4.1 Impact of IaaS and PaaS

Cloud providers build large capacity data centers, and from those data centers they can rapidly scale up and down the service allocated to the customers. Therefore, when the company IT department uses IaaS and PaaS services, the existing IT infrastructure capacity will not be a limiting factor to serve the business user's needs [44]. Cloud provides elasticity, which is not the case with on-prem solutions [45]. When using a cloud-based solution, companies may become more flexible an agile [46]. As a result, IT systems become more flexible from the business point of view and able to support the changing business needs, thus the alignment may improve.

4.4.2 Impact of SaaS

Another reason for IT inflexibility is the complexity and inhomogeneity of existing systems. When integration is required with the existing systems, cloud services do not resolve this problem, however, those can be used for a new application outside of the current architecture.

For example, a SaaS solution for recruiting new employees (advertising available positions on-line, accepting and sorting uploaded CVs, providing a workflow for the selection process) does not necessarily have to be closely integrated with the company's ERP system. Instead of waiting for the upgrade of the on-premise ERP system to add a new recruitment module to it, the HR department may use a recruitment SaaS solution from an external provider, without dealing with the problem of inhomogeneity of the internal IT systems.

With SaaS, new business solutions can be provided in a shorter timeframe, which improves the alignment between the business needs and the IT solutions supporting those needs.

Based on the analysis, Table 1 summarizes the possible impact of cloud services on strategic alignment.

Table 1 - The possible impact of cloud services on strategic alignment

	Alignment probem		
Cloud service model	Lack of understanding each other domains	The expressed need of business keeps changing	IT systems are not flexible enough to support the changing need of business
IaaS / PaaS	No direct impact Reassigned role of IT department has a **potentially positive impact**	Increased flexibility to accommodate changing needs Positive impact on alignment	Increased flexibility to accommodate changing needs Positive impact on alignment
SaaS	Working directly with SaaS provider beneficial for business users Positive impact on alignment	Limited customization possibilities and use of best practices keep changing needs under control **Potentially positive impact on alignment**	SaaS solution is more elastic than on-premise systems; faster deployment Positive impact on alignment

5 Discussion

Despite the major impact of cloud computing, there is a lack of academic research on its impact on changing role of IT and strategic alignment. Research firms and market analysts however already report figures which are signs of the change.

According to IDC, business units of companies already rely heavily on external IT services (such as cloud) versus the company's IT department [47]. IDC expects that by 2020 the spending on external IT by business units will nearly equal the spending of IT department.

IDC reports the appearance of 'shadow IT', when business units bypass the IT department. According to IDC, "Shadow IT projects are funded from the functional area budget without the knowledge, involvement, or support of the IT department."

Another research firm, Gartner highlights that marketing departments are extensively using external IT services for their campaigns. Gartner predicted that already in 2017 marketing spent more on technology than IT [48].

Based on the response from 245 companies, a survey run by Select Hub concludes that "There is a movement away from allowing the experts in IT departments to exercise complete control (due to their expertise), and turn towards the users themselves, as the software environment encourages their participation" [49].

Tim Killenberg, senior vice president of N3 (an outsourced, integrated sales and marketing execution firm), says that "We are seeing a sharp increase in the number of line-of-business buyers who are empowered to make technology purchase decisions themselves. Reaching these buyers requires a new sales mindset and new skills" [50].

Besides the benefits of the model where business users order IT services directly from cloud providers, there are threats as well. Coordination of different IT systems falls out of the hand of IT department. There is a risk that several systems will be used by the company – as result of the direct purchase by business units without the involvement of IT department – which will not be integrated or linked. The appearance of shadow IT can increase the risk of loss of valuable and confidential data [51].

IT department's loss of control over the company's IT system can increase the 'chaos' of existing systems, instead of decreasing it. Without coordination by the IT department, the Enterprise Architecture of the company may disintegrate [52, 53], which may have a negative impact on the company's operation [46]. Therefore it is imperative for the IT department to become a service integrator in a new governance model, linking and integrating different on-prem and cloud services [39].

6 Summary

The role of the company's IT department is changing due to the growing use of cloud computing services. The changing role will impact the long-researched alignment between business and IT.

In this paper, we analyzed the potential impact of cloud computing on the business-IT alignment. We concluded that cloud services could positively impact some of the problematic areas of business-IT alignment, therefore the use of cloud services may lead to better alignment.

The IT department's role is changing in the cloud environment. IT has an important role to coordinate and integrate between different on-premise and cloud-based solutions. By outsourcing basic tasks to cloud providers and reassigning

roles, IT department has a better possibility to focus on higher level business solutions and to become the strategic partner of the business.

The findings of this study are based on an analysis of the literature and industry experience of the author. The findings should be empirically tested, which can be a subject of future research.

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Health and youth

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Abstract: Health and health education are an important part of youth education. The target of education is the develop the youth and give them everey important tools to become heatlhy men and women. Health is wide territory and consists of different aspects of life and life territories. However, how do young people think about health, how it important is for them? The article examines the place and role of health in society, education and the food industry, focusing on the consumer's opinion. Following the evaluation of the questionnaire, we can see that the level of health awareness is not too high among young people, which is reinforced by the fact that there is no health education in schools either. This will have more serious consequences for the longer term, whose economic impact is expected in the future.

Keywords: healt, diseases, healt expenditure, consumption, healthy food, education

1 Material and methodology

Hungarian and international literature are used and read to the writing. However a survey was made to measure the approach of the students in recent years. The center of this research stands the following questions: overweight, physical activity, mental conditions and food consumption of youth and children.

2 Introduction

Health has been a central issue for humanity for thousands of years. Illnesses, accidents and health problems are part of the history of humanity. Even the old scriptures mention it, think here of the stories of the Old Testament or the New Testament. Who would not know the story of a blind man from birth, or the cases of infertile women. Initially, the people of the ancient times lived in a closer look to the nature in terms of the terms, so they kept their laws automatically, and as a result they were healthier than today. Later, he poured the nature out of the wilderness of a person who was extinct, could have locked him in, and even could break his laws. Examples include construction sites, village communities, natural disasters, the use of means of transport or the use of domestic animals. At the same time, it is also conceivable that even in recent centuries it can be proved that the average age of people was lower. With the development of public health and medicine, people's life expectancy increased and healthier people lived. At the same time, one of the results of these changes is the underprivileged religious life and the foreground of the materialistic human image which has affected both education and remedy. As a result of this material human image, man is a naked ape, blood, bone, and flesh, whose knowledge so far extends. The manuscript of the old religions was different, which today's science regards as a belief, a religious approach. It is true that statistics show improvements in terms of better nutrition and public health, but at the same time, the twilight of the twentieth century, the emergence of psychology, which aims at the healing of different deviances, shows that, in vain, physical health is not balanced by the soul, something is missing the soul. These changes also had an impact on education, and they also shaped the health outlook in schools.

If we look at the healt expenditures from 2003, we can see that they have increased constantly from that time. Healing and rehabilitation in-patient and one-day care and medicine are the leaders with 25-33% of total expenditure. The ratio of outpatient care is 20-24% of the total. As these data are similar in different years, we can say that there is no increase and no decrease, and as the number of cases sent by local doctors has not changed in last years, the main reason of the total data increase is the inflation. As the number of inhabitants decreases in Hungary, we can say that the reason of the increase is more expensive expenditures.

Table 1. General practitioner's case

Time	General practitioner's case
2010	54 593 413
2011	54 998 151
2012	55 257 892
2013	55 262 455
2014	54 875 481
2015	55 458 938
2016	55 348 090

Source: KSH, 2018.
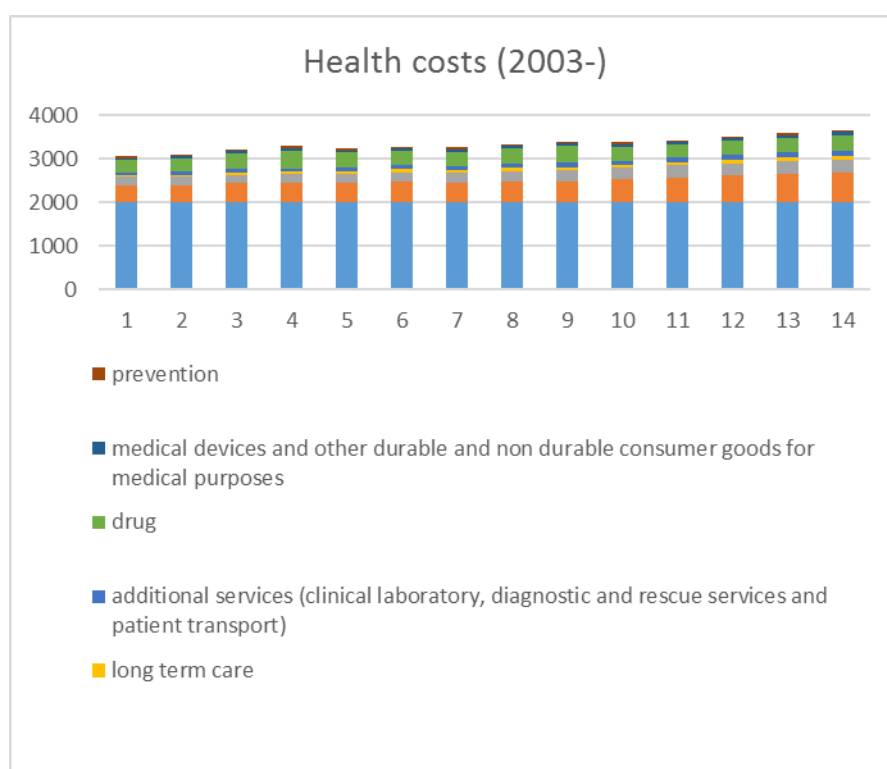
Figure 1. Health costs in billion HUF in Hungary Source: KSH, 2018

The most important is prevention cost. But in the expenditure structure its ratio is very low. It means in the health system prefer aftercare to prevention and not supporing the healthy life style and helaty food and so on. But we need a change

in our mind in this field because decreasing volume in healt expenditure means worse possibilites in health care, which cause that we need to listen to prevention. It consists of sport, health education, health food, healthy environment and spiritual and psychical healthy family.
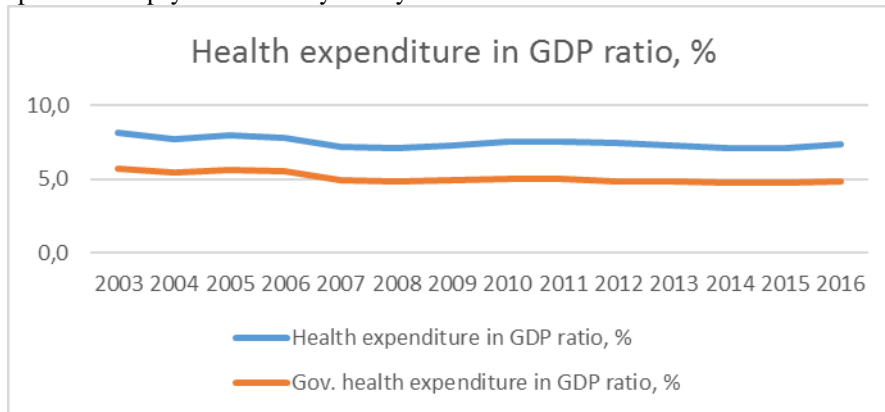
Figure 2. Health expenditure in GDP ratio, % Source: KSH, 2018

We can see that the health expenditures in GDP ratio decreased year by year. The main reason of it is to fluctuate the value of GDP year by year while healt expenditure cannot increase with the same volume, so relativ value of healt cost decreased in Hungary for ages. Both health expenditure and cost have increased year by year. While of which the govermental expenditure has decreased. The government in Hungary leaves this sector and its play decreased.
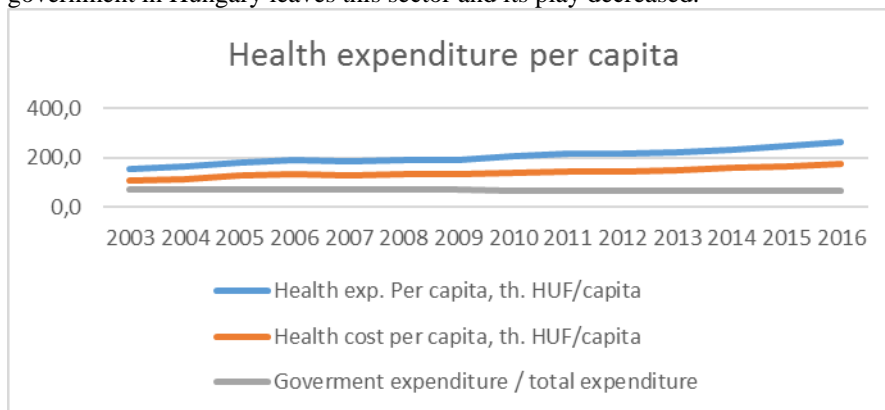
Figure 3. Health expenditure per capita Source: KSH, 2018

On average, 4.1 percent of health expenditure will increase by 2017 and 2021 worldwide. Higher spending, however, does not necessarily mean better health outcomes, healthcare providers are likely to continue to have declining profits and

increasing costs. Instead of treatment, prevention comes to the fore, resulting in the emergence of "well-informed" health consumers instead of simple "patients" [2].

Figure 4. Key issues in global healt care Source: Delloite, 2018

Decreasing profits in the precarious and changing healthcare sector: Healthcare providers are likely to continue to have declining profits and increasing costs. By 2020, the aggregate health spending of the world's largest regions is expected to reach $ 8.7 trillion compared to $ 7 trillion in 2015. To compensate for declining profits, many health care organizations introduce new cost-cutting measures and look after new revenue sources.

Strategic shift from quantity to quality: Health continues to shift from the fee paid for the service (FFS) to earnings and value-based payment models. In advanced healthcare systems, sector actors emphasize prevention rather than treatment, which results in "well-informed" healthcare consumers instead of simply "patients".

In order for a transition to value-based care to be successful, it is also necessary for actors, including consumers, to look at health rather than health care, instead of

treatment instead of prevention and well-being, and health instead of the individual.

Reaction to Health Policy and Complex Control: The cyber attacks of recent times have placed greater emphasis on data protection and security. Digital healthcare is a challenge for governments, healthcare providers and insurers since they need to gather, analyze and store more and more data while also ensuring compliance with legislation, ethics, and risks.

Discovering Exponential Technologies to Reduce Costs, Increase Access, and Improve Supply: Exponential technologies make supplies less costly, more efficient and more accessible on a global scale. Demographic and economic trends combined with advanced technology are already predicting how future hospitals will work in terms of workforce, size, and design. That is why actors need to plan their strategic investments in human resources, processes, and infrastructure in consideration of digital technologies.

Focus on Clients and Improving Patient Experience: Personal Services have become a top priority for consumers, and technology also enables them to become more active in decision-making. Service providers and payers should take advantage of digital trends to provide more personal care, improve communication, and improve patient experience and involve technology in research, diagnosis, treatment, and aftercare.

Transforming the Future of Work: With the fourth industrial revolution, digital technology, robotics, and other automated tools offer a wealth of opportunities for current and future workforce health issues - if sector actors are open to it [2].

The ratio of health expenditure to GDP declined by 0.9 percentage point between 2005 and 2008, by 0.4 percentage point, mainly as a result of the economic downturn measures, budgetary rigor and the reform of the pharmaceutical price support system.

Between 2007 and 2009, the real value of per capita spending on health has declined, and after 2011, it has recorded a curve similar to that of GDP, although it has not reached the GDP growth rate. In 2012–2013, even the negative sign of change was in positive territory, and in 2015 it reached the level of GDP growth. From 2012 onwards, besides the budgetary aspects, the structural transformation started also had an impact on the GDP-proportionate expenditure. The amount of pharmaceutical price support declined in 2012–2013 as the so-called 'price-list' was introduced. "Blind" procedure. The essence of this is that the National Health Insurance Fund (OEP) announces a competition for medicines containing the same active ingredient, and after choosing the cheapest offer for the same preparation containing the same active substance amount of aid. In addition, if the pharmacy the "active ingredient" of the same active ingredient is "lower" to provide the consumer with daily therapeutic costs, benefit.

The health spending per capita in Hungary in 2015 was € 1,371, with Hungary accounting for the lowest third of the EU member states (the EU-28 average was € 2,781). We also occupy the lower third of the 7.1% of GDP spending on health expenditure (EU-28 average 9.9%). Health expenditures in relation to Gross Domestic Product reaches or exceeds slightly in three EU countries.

11%: Germany, Sweden and France, but Europe is a non-EU country, Switzerland is the leader (11.5%). We have a similar value to ours in Slovakia, but at the same time, we have lower GDP-related spending in our two neighbors, Croatia and Romania, as well as Poland, Cyprus and the three Baltic states.

The economic crisis of the last decade in most EU countries has not had a significant impact on the real value of health spending. After a decline in 2007-2009, the real value of spending in Hungary decreased again in 2012, and although it will be postponed after 2013 the average for the change in the Visegrad countries, 2005 is the base year level has not yet been reached [4].
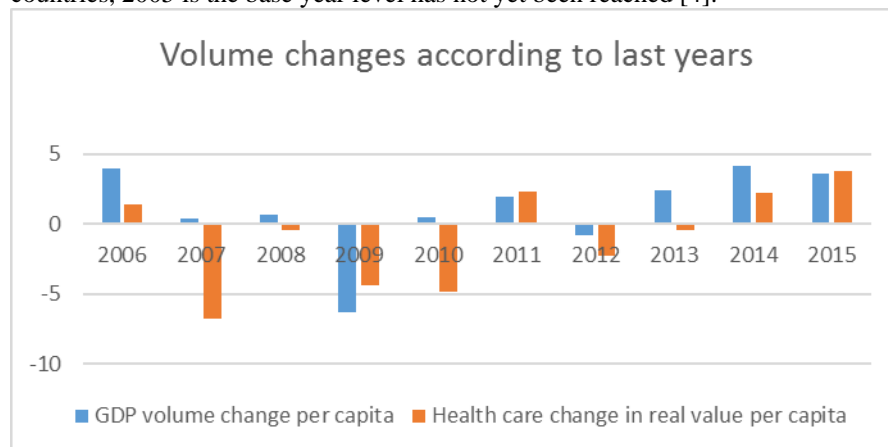
Figure 5. Volume changes according to last years Source: KSH, 2017

3. Health conditions and of Youth in Hungary

First of all, we can look at the subjective health condition of Hungarians. Based on a subjective assessment of health, 89% of the population is satisfied with their health or at least consider it satisfactory. 61% of respondents (65% of men and only 58% of women) consider their health to be good or very good. Compared to the 2009 ELEF data, it can be stated that in 2014, the population evaluated their health status more precisely. Both sexes increased (from 59 to 65% for men, from 50 to 58% for women) from their own health, and decreased (from 12 to 10% for men, from 17 to 12% for women) Negative Rate.
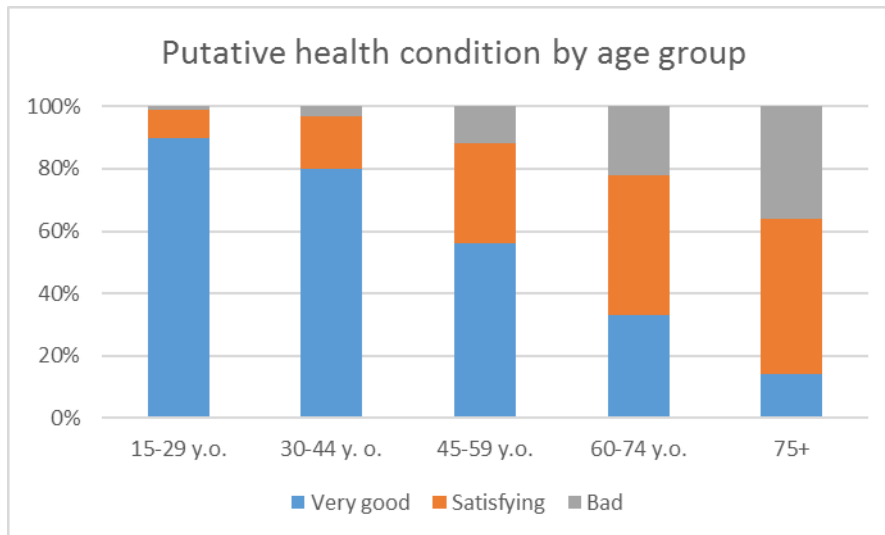
Figure 6. Putative health condition by age group 2014 Source: KSH, 2015

It means that while the human is young no having problems and pains, they think everything is good and very good, but the affect of the faults cannot be felt.

Among lifestyle factors, smoking is considered to be one of the most important threats to health. One of the most important causes of cancer (especially in the case of lung cancer), but also in many other diseases (cardiovascular and respiratory system). It is now clear that not only does an active smoker's lifestyle have health disadvantages, but passive smoking can also damage health.

According to ELEF 2014 data, 29% of the adult population smokes compared to 31% in 2009. However, only the proportion of casual smokers has fallen between the two dates, and the number of regular smokers has not changed significantly (28 in 2014, 27% in 2009). In 2014, the proportion of occasional lighters is negligible, only 1.6%. The difference between the two non-smoking habits is significant and slightly increased compared to 2009: fewer than a quarter of women and one third of men are regular smokers.

Smoking habits vary greatly in different age groups. Among 15- to 18-year-olds, 14% of girls smoked, while almost a quarter of boys in the same age group smoked. This is significantly higher for women in the next two age groups (18–34 and 35–64 years) however, there is no significant difference between the two age groups (29% and 27%, respectively). However, only 7% of women over 65 are regular smokers.

In men, the proportion of young people in the young adult age group (18–34 years) is almost twice as high as that of juveniles. The 42% ratio shows a significant increase compared to 36% in 2009. There is no significant change for

middle-aged people: 35% compared to 36% in 2009. Finally, only 18% of the oldest men smoke regularly, and among them is a the highest rate of quits (38%). However, in the case of women, most cohorts due to cohort effects occur not in the retired age group but in the middle-aged. When today's seniors were young, smoking was even more male-like compared to the current one, so fewer women used it, and so they knew less. Gender differences, even today, are still prevalent, but with this emancipation, women are more likely to have this harmful passion [7].

According to a survey in 2018 152 persons smoke from 328 responders which means 46,3%. But this survey is not representative it can sign higher percentage than domestic average. 6% of the responders is under 18 and 22% is 18-25 years old. So 28,5 % is youth. Plus 14% is passive smokers. 50% of young smokers there is smokers in the family and 50% of ones thought about giving the habits of smoking [9].
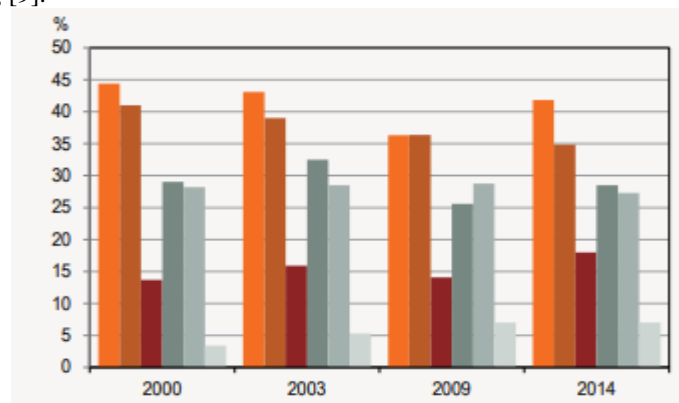
1, Men 18-34 y.old, 2, Men 35-64 3, Men +65 4, Women 18-34, 5, Women 35-64 6, Women +65

Figure 7. Regular smokers ratio by gender and age group 2014 Source: KSH, 2015

Among the legally available addictive agents, besides tobacco products, alcohol is the one where excessive consumption causes the most significant problems, both on an individual and social level. Binge drinking poses a significant risk for various health problems, such as liver cirrhosis, stroke, cancer, birth defects. At the same time, moderate alcohol consumption can have a beneficial effect on health: according to research, chance of developing vascular diseases. In the ELEF questionnaire, the frequency of alcohol consumption and each we asked him about quantities consumed on occasions. Based on the self-declared values, we classified the population into four categories: big drink, moderate alcohol, rarely consumed alcohol, and non-alcoholic consumers keep the actual consumption and report less quantity. About a third of the population say they never drink alcohol - women are more than twice as likely to be abstinent (40%) as men (18%). By age group, juveniles (15-17 years old) and the oldest (over 65 years) are among the highest in

this category, while the least abstinence in this field is 18-34 years old. More than half of retired women never drink alcohol while only one in seven young men. At the same time, the problem of binge eating is most affected by the oldest age group of both genders, although the proportion of big boys is negligible for women: 2% of those over 65 belong to this group (1.4% of all women), while for men it is 14%. -a (9.9% of all men). Overall, 5.4% of the total adult population can be classified among the grandparents based on reported values. This represents a slight increase compared to the 4.6% estimated in 2009 [8].

Exercise plays an important role not only in achieving and maintaining proper body weight, but can also help prevent many diseases. Nearly half of the population is mostly sitting or working (this is not just about the role in the labor market, but also about other work-related activities such as housework, family care, and learning). Passivity characterizes women to a greater extent than men, while work that involves physical exertion is more of a male characteristic, and only a minimal proportion of women. Not only is there a little movement associated with work activity, but a leisure, sport-specific exercise is also rare and modest in duration. Two-thirds of the population (67%) do not play 10 minutes a day. The most sporty people who exercise every day of the week make up only 4.5% of the adult population. The proportion of those who work on muscle strength and endurance exercises on a daily basis is only 3.2%, compared to 76% of those who are completely neglected.

Regular walking or cycling is also a proven health protection. The data show that walking does not affect only 15% of the population at all, with the overwhelming majority walking at least 10 minutes a day. At the same time, 53% of the population do not spend half an hour on an average day. Cycling is much less frequent: 60% of adults do not use this tool at all, but one in ten people rounds up on a daily basis. More than half of cyclists spend less than 30 minutes on average per day, while 15% spend at least one hour a day.

I would just point out one aspect of healthy eating: the right amount of vegetable and fruit consumption. According to the results of the survey, the vast majority of the population aged 15 years and over (96%) consume some vegetables and / or fruits daily.

The proportion of consumers consuming several times a day is also relatively high, two-thirds of the total population. There are some differences between women in this respect: while women are 72, only 62% of men eat vegetables and fruits several times a day. There are also age differences: the oldest 79 and the youngest 60% belong to the regulars. .

Overweight, obesity is a disease in itself, but it also contributes significantly to the development of many other diseases (such as coronary heart disease, ischemic stroke, diabetes, and cancer). The degree of obesity was determined by the body weight index (BMI12), measured in kilograms of body weight and square meters of height measured in meters. The survey questionnaire includes self-reported

values, and according to the instrumental measurements13 in the ELEF sub-sample in 2009, people often underestimate their weight and overestimate their height. That is why it is particularly unfavorable that more than half (54%) of the total population is among the overweight-obese based on the self-reported values. This is higher for men (61%) than for women (48%). According to the experience of 2009, women are more inclined to declare less weight than real [8].

4. Consumer' habits and trends

The research would like to analyse and compare to Hofer's research in 2006. and ask the question whether there would be change compared to 2006. research. The analysing about what has happened in the past 11 years. According to demographic data, the research examined household income and consumers, consumption habits. The survey answered the question of the beneficial and disadvantageous properties. In 2017, 102 students of Obuda University were riported in this research.

Table 2. Basic data of the survey

Age	23,29
The number of persons living in the household	3,02
Children under 18 age	0,40
Net income of the household in thousand HUF	326,60
Consumption of food in thousand HUF	53,84

Source: own research

Because of the health reason, consumption can be increased. This also effects a more environmentally friendly technological method, which can improve the environmental performance. Hofer thinks that the main motivation factor of consumption is health protection and the environment protection and economical competitivenes is consequence [3]

The survey consisted of 20 questions. The topics of the questions were environment pollution, helathy nutrition, awareness of consumers, self sufficiency, marketing tools.

Table 3. Some basic data from the 2 difference surveys

Category	2006. Hofer	2017. Obuda
Ratio of gender	29,6 % male	50% male
Average age	28,8	23,3
Ratio of organic consumers	56,40%	74,50%

Source: own research and Hofer 2009.

This research consisted of more males and younger responders than Hofer's one. We have to ask: what are the main factors for consumption of organic food. Hofer's answer is health, prevention. However health care and children health care are the main answers. According to newer survey for example marketing tools can affect lower level for the consumption. Newer research showed better quality (which is a marketing tool possibility) and health reasons are the main reasons. In the newer one most of the responder the main motivation is having children and child's health was more important than today. Food security, healthy life, offering of a doctor were the other motive. In Hofer's survey the responders's opinion was that organic food is healthier. Cereals, fruits and vegetables, meat, dairy productions are the favourite organic food. The more fruit and vegetables consumption seems to be more helathier according to food science. Lack of using chemicals and artificial fertilizer helps to be more healthier of organic food therefore ot can help to the health.
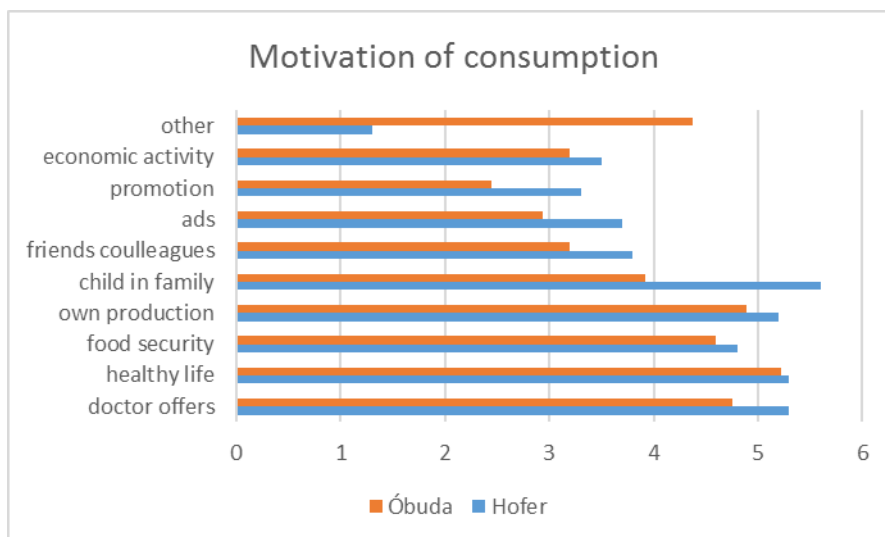
Figure 5. Motivation of consumption
Source: own research and Hofer 2009.

However it is apparent from consumers' requeires to promote better distribution, it is essential to be broad and deep reach possibility. With the help of basic marketing tools, the consumer can be increased by using more modern, digital tools of marketing [1].

Conclusions

The health thinking and conditions between the youth is not bed but we have a subjective aspects of the question. Unfortunately, smoking, alcohol drinking and

overweight are main problems, which is available in this age group. The role of the education is essential.

White et al. say the importance of education interventions early in the education process for health professions students. Education programs, especially for public health education students, may prevent stereotyping attitudes and behaviors and with these can help that students should recognize that in the future can help the individual development towards the health [10].

The lack of effect on dietary habits could be explained by a number of factors. First, due to low budget, shorter time willingnes for the dietary, which likely did not adequately capture dietary habits. Fruits and vegetables prices are higher, a fact that might have limited the availability of fruits and vegetables among our low-income students [6].

Attitude scales for health education two factors were found as "attitude towards teaching factor in health education" and "attitude towards learning factor in health education." This means as attitude and stereotypes changes need for health thinking changes the eductaion thinking changes need toward the school system changes. This can be the evidence that the teachers consider the health education not only as an information transfer but also the student dimension [5]

The health factor of domestic organic-products is the great importance, but it is not enough for developing the healt parameters. The consumer price of the product range is one of the biggest obstacles to widespread use of these products. But its background stand the stereotypes and lack of change willingnes. The role of mistrust is significant. Comfortable is good for the human and they do not change in lot of cases when the trouble is large.

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The past and future of CAP - Hungarian and Polish similarities and differences

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Abstract: The Common Agricultural Policy needs to be constantly reformed and this is because it is not possible to create a perfect solution for all 28 Member States, which means that continuous experimentation is taking place, improving the CAP by reforming the issues and trying to answer the questions which emerge. The most recent reform measures are the common organization of agricultural product markets, direct payments to farmers and rural development policy. The article looks at how this is happening in our country and Poland, what are the successes and what are the measures for which we can not talk about success.

Keywords:CAP, Hungary, Poland, trade balance

1 Introduction

The European Union (EU) accession was a remarkable moment in both Hungary's and Poland's history. That wave was named the Eastern enlargement and those countries are often called EU-12 (or EU-13 with Croatia) or the new member states (NMS). The other "half" of the Union is the EU-15 or the old member states (OMS). The straightforward influence of the integration on the trade connection is often studied and the latter one became tightened even during the integration process (De Santis et al., 2005). The characteristics of Poland and Hungary are very similar. But the territory and inhabitants' number of Poland is more 3-4 times than Hungary, the agricultural structure and characteristics are very similar. Polish

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Utilised agricultural area (UAA) (ha) is 3 times more than Hungarian one. We can see small average holdings territory in both countries. This small territory means smaller capital level, lack of machineries, smaller Balance sheet and turnover, market ratio. Totally it is not good characteristics of both countries's agriculture.

Table 1.: Farm structure Source: Eurostat

	(%)			
	Number of agricultural holdings	Utilised agricultural area (UAA)	Number of agricultural holdings	Utilised agricultural area (UAA) (ha)
EU-28	100,0	100,0	10 841 000	174 613 900
France	4,4	15,9	472 210	27 739 430
Spain	8,9	13,3	965 000	23 300 220
United Kingdom	1,7	9,9	185 190	17 326 990
Germany	2,6	9,6	285 030	16 699 580
Poland	13,2	8,3	1 429 010	14 409 870
Romania	33,5	7,5	3 629 660	13 055 850
Italy	9,3	6,9	1 010 330	12 098 890
Ireland	1,3	2,8	139 600	4 959 450
Greece	6,5	2,8	709 500	4 856 780
Hungary	4,5	2,7	491 330	4 656 520

We can see Hungarian UAA is 50,1% of all territory while cultivation area is 79,2% ot the total. In Poland UAA is 46,1%, while cultivation area is 52,7%. Arable lands are similar in both countries. Hungary has 81,6% and Poland has 74,7%. Both of countries are typical Agricultural ones with good opportunities for cultivation.

Table 2.: Average utilised agricultural area per holding, 2010 and 2013 Source: Eurostat

	2010	2013
EU-28	14,4	16,1
Czech Republic	152,4	133,0
United Kingdom	90,4	93,6
Slovakia	77,5	80,7
Denmark	62,9	67,5
Luxembourg	59,6	63,0
France	53,9	58,7
Germany	55,8	58,6
Poland	9,6	10,1
Croatia	5,6	10,0
Hungary	8,1	9,5

The total agricultural output of Poland increased from 2007 to 2013 and it was 6,58% while Hungarian ones were stagnated and its value was 1,7% of total EU. The Polish output strengthten while Hungarian one did not. Labour force has increased in both countries (Polish one was 20%, Hungarian one was 4,56%)which means more work force demand in this sector and work force compensation instead of machineries and capital. Livestock has decreased in both countries which signed lower quotas and problems in animal farming.

Table 3.: Output, labour force and livestock, 2007–13

	Standard output (EUR million)			Labour force (1 000 annual work units)			Livestock (1 000 livestock units)		
	2007	2010	2013	2007	2010	2013	2007	2010	2013
EU-28	285 597	308 062	331 044	11 850	9 946	9 509	136 793	135 212	130 174
Belgium	6 638	7 248	8 407	66	62	57	3 788	3 799	3 584
Bulgaria	2 314	2 537	3 336	494	407	320	1 246	1 149	1 025
Czech Rep	3 593	3 852	4 447	137	108	105	2 053	1 722	1 728
Denmark	6 918	8 431	9 580	56	52	54	4 582	4 919	4 133
Germany	44 202	41 494	46 252	609	546	523	17 985	17 793	18 407
Hungary	4 655	5 241	5 578	403	423	434	2 409	2 484	2 259
Malta	85	96	97	4	5	4	50	42	35
Netherland	18 071	18 930	20 498	165	162	153	6 415	6 712	6 602
Austria	5 199	5 879	5 671	163	114	111	2 473	2 517	2 439
Poland	17 035	18 987	21 797	2 263	1 897	1 919	11 118	10 377	9 165

Source: Eurostat

Table 4.: Land belonging to agricultural holdings, 2013

	Land belonging to agricultural				Total land area (km²)	Land belonging to agricultural holdings	(hectares)		
	Utilised agricultural area (UAA)	Wooded area	Other (unutilis ed) land				UAA	Wooded area	Other (unutilis ed) land
EU-28	40,0	6,7	2,3		4 356 450	213 503 110	174 358 310	29 168 700	9 976 120
Ireland	72,5	2,2	2,5		68 394	5 277 990	4 959 450	147 940	170 590
United Kir	70,5	3,2	2,2		242 509	18 417 700	17 096 170	786 840	534 700
Hungary	50,1	17,0	8,7		93 024	7 048 760	4 656 520	1 583 180	809 060
Austria	33,1	27,5	10,0		82 409	5 815 840	2 726 890	2 264 830	824 130
Denmark	61,0	4,1	3,0		42 916	2 922 230	2 619 340	175 750	127 150
Czech Rep	45,2	19,7	0,8		77 227	5 076 430	3 491 470	1 520 460	64 500
Romania	56,8	5,3	1,7		230 022	14 661 380	13 055 850	1 214 180	391 360
Slovakia	38,8	22,6	1,2		49 036	3 067 090	1 901 610	1 108 700	56 770
Spain	46,4	9,4	4,1		501 757	30 042 210	23 300 220	4 696 770	2 045 210
Netherlan	54,8	0,4	4,4		33 718	2 008 870	1 847 570	12 230	149 070
Luxembou	50,7	2,3	0,3		2 586	137 790	131 040	5 900	850
Italy	40,1	8,9	3,8		302 073	15 933 790	12 098 890	2 680 220	1 154 690
Poland	46,1	3,3	3,3		312 679	16 487 480	14 409 870	1 033 130	1 044 480

Source: Eurostat

Table 5.: Land belonging to agricultural holdings, 2013

%	Arable land	Permanent grassland and	Permanent crops	Other
EU-28	59,8	34,2	5,9	0,2
Finland	98,5	1,4	0,2	0,0
Denmark	91,5	7,5	1,0	0,0
Sweden	85,1	14,8	0,2	0,0
Hungary	81,6	15,1	3,0	0,3
Lithuania	79,6	19,6	0,8	0,0
Malta	78,8	0,0	11,6	9,7
Poland	74,7	22,3	2,9	0,2

Source: Eurostat

2 Methodology and data

This part of research is based on time series analysis starting from 2000 (before the accession) to the latest available year in the generally used databases, which is 2017. Importance of the agriculture is measured by the share of agricultural employment and the agricultural value added (VA) as a share of gross domestic product (GDP). Main data sources for these indicators is the World Bank's World Development Indicators (WDI) database. It is followed by the share of agricultural export within the total export for these countries and the comparison of the Hungarian-Polish agricultural trade importance. These calculations are based on the World Bank's World Integrated Trade Solution (WITS) database between 2000 and 2017 on agricultural products (chapters 1 to 24).

3 Agriculture matters

The significance of the agriculture can be measured by the share of agricultural employment within the total workforce and the agricultural value added as a share of GDP. Figure 1 shows them for Hungary and Poland.
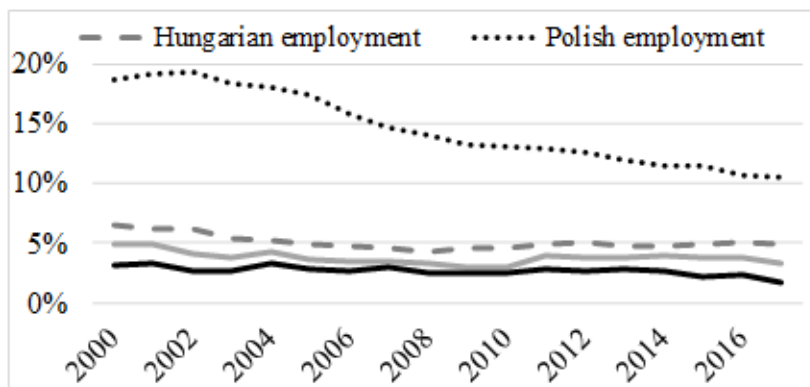
Figure 1. Agricultural employment and value added in the analyzed countries
Source: Author's composition based on the World Bank's WDI (2018) database

It can be seen on the figure above, agricultural employments show a generally decreasing trend during the analyzed period, however the Polish one was still above 10% in 2017. As a matter of the agricultural value added, both the Hungarian and the Polish values are lower comparing the employment ones, 3.3 and 1.7% respectively.

Besides these basic indicators, agricultural export volume and especially its agricultural share gives further insight into the importance of the sector. Figure 2 shows it for Hungary.
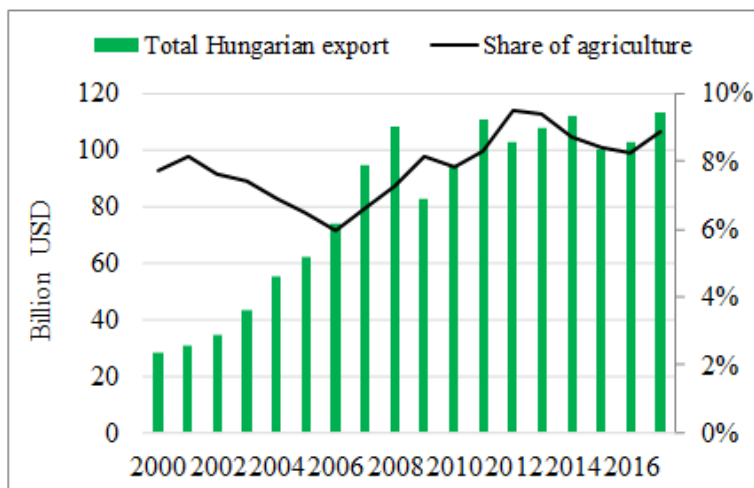
Figure 2. Evolution of the Hungarian export and the share of agriculture
Source: Author's composition based on the World Bank's WITS (2018) database

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A remarkable growth can be seen even before the accession; however, it has been accelerated after 2004. Only the global financial crisis caused a noticeable drop, otherwise it has been stabilized around 110 billion USD. The share of agriculture fluctuated during these years and ended at 9%. The same has happened with in Poland with high and accelerated growth and the decrease in 2009. According to the data, agriculture plays a more important role Poland in terms of export revenues because it exceeded 13% in the last couple of years (Figure 3).
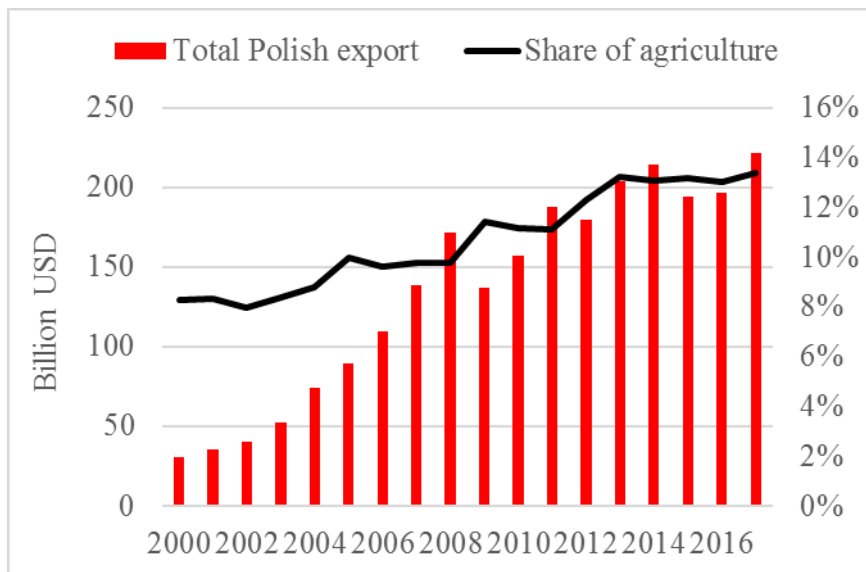
Figure 3. Evolution of the Polish export and the share of agriculture
Source: Author's composition based on the World Bank's WITS (2018) database

The following important indicator of the agricultural performance is the trade balance. Hungary had historically a remarkable trade surplus which was adversely affected by the EU accession on the short run (2005-2006). After that it started to grow and peaked at 4.7 billion USD in 2013. From this aspect Polish agriculture was a clear winner of the EU enlargement: the previous trade deficit turned into surplus even one year before the accession and increased rapidly, especially from 2012 to 2013. It value was 9.5 billion USD in 2017 (Figure 4).
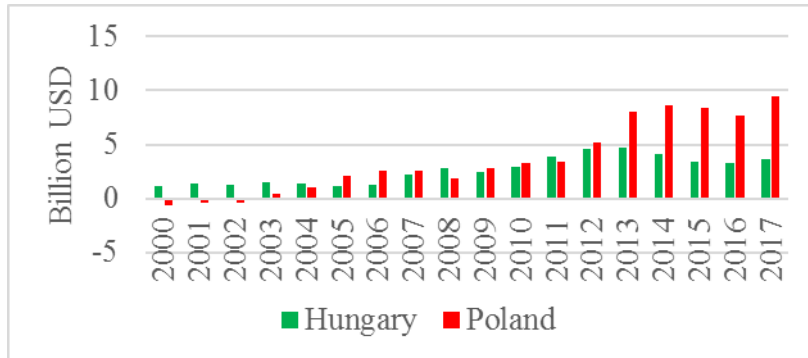
Figure 4. The Hungarian and the Polish agricultural trade balance

Source: Author's composition based on the World Bank's WITS (2018) database

Hungary and Poland are geographically close to each other; therefore, it could be anticipated higher level of trade between them. The accession has positive impact on the Hungarian agricultural export, it became 5 times higher, however the share of Poland have not changed a lot, it fluctuated between 4 and 5% (Figure 5). In contrast, the Polish agricultural export became 11 times higher by the end of the analyzed period. The share of the Hungarian markets increased after the accession, but its final value the same as its initial one (Figure 6).
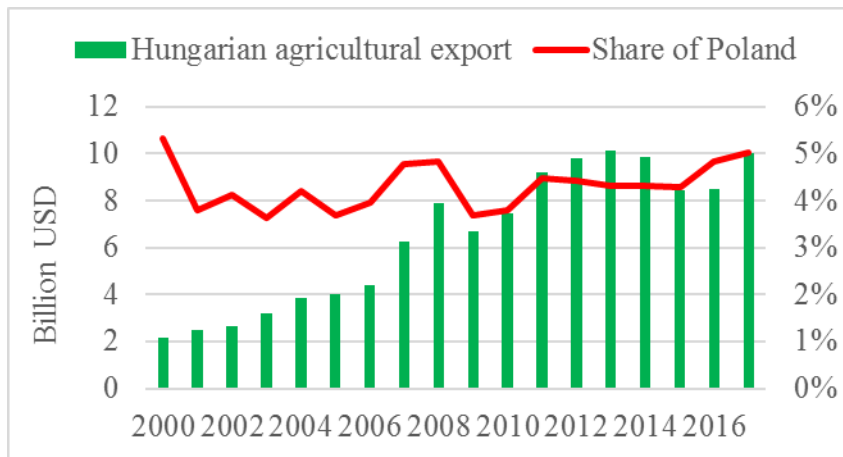
Figure 5. Poland, as a trading partner of Hungary

Source: Author's composition based on the World Bank's WITS (2018) database

Figure 6. Hungary, as a trading partner of Poland

Source: Author's composition based on the World Bank's WITS (2018) database

Comparing the country level agricultural export values, the Hungarian-Polish agricultural trade balance can be calculated. Figure 7 summarizes these values.
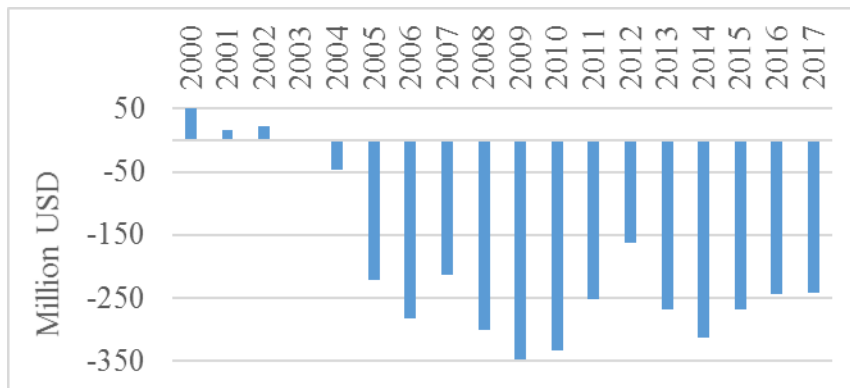
Figure 7. Change of the Hungarian-Polish agricultural trade balance

Source: Author's composition based on the World Bank's WITS (2018) database

The figure above confirms the previous results. The accession had positive impact on both countries' agricultural performance, but Poland benefited more from it. Although Poland imported more agricultural products from Hungary then the opposite, it turned into trade surplus even in 2004 and multiplied in the rest of the analyzed period. One of its reason is the sectoral difference between the two countries: Hungary is dominated by the crop sector, while animal husbandry plays a more important role in Poland. It is advantageous because the animal sector can be characterized by higher value added. Another remarkable difference the three times higher Polish factor income (Table 1).

Table 6. Agricultural income composition of Hungary and Poland, 2017 (basic price, million euro)

Agricultural income items	Hungary	Poland
Agricultural output	7 509	23 898
- crop output	4 475	10 701
- animal output	2 445	12 587
- other output	589	610
Intermediate consumption	4 594	14 104
Gross Value Added	3 240	10 116
Subsidies	1 317	2 171
Factor income*	3 611	10 222

* Factor income = Gross Value Added – Consumption of fixed capital – Taxes + Subsidies

Source: Author's composition based on EC (2018a) for Poland and EC (2018b) for Hungary

Conclusion

Hungarian agricultre's opportunities have destroyed strongly in the last decade vs Polish ones. Since 2004, accession of the EU, Polish agriculture was ablet to reach benefit from this accession while Hungarian one was not.

- Polish producers exports main higher produced production to Hungary like tobacco, Meat, Milk production while Hungarian ones exports basic produced like cereals. The margin is much more lower in the case of Hungarian produces.
- Polish subsidies increased very much after EU connection more than Hungarian ones.
- But Polish subsidies in nominal lower than Hungarian one but Polish farmers use them more efficient.
- Polish sharing of production more based on Horticultural production like fruits and vegetables which margin is higher because it claims more well educated working hours.

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Blockchain in Taxation

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Abstract: Since blockchain technology has appeared, it has spread to many areas of the economy. From the legal field, through financial service providers to insurance companies, we meet in a large number of areas this technology. The question arises, when will the first complex blockchain solution appear in the field of taxation? From the corporate sector to the state administration, all sectors are involved and interested in the continuous development of the technology in the taxation process. Can blockchain technology breakthrough the field of taxation? Will it be able to make a breakthrough in technology in the field of taxation?

Keywords: Taxation, Blockchain,

1 Introduction

Taxation has been present in societies since the beginning of human history. It is necessary for the societies to function to determine, record and collect taxes. While the taxation process itself has hardly changed in history, the more the laws and regulations that determine the content of the taxation process are changing. More complex taxation systems increase the number of administrative tasks, causing administrative difficulties for taxpayers. The common goal for everyone is that this process is smooth, traceable, secure and credible. The state is interested in ensuring that planned tax revenues are timely and accurately received in the budget and that the tax authority can also exercise its control function. Businesses are interested in accurately following the tax rules, fulfilling their obligations within the deadline, not having a tax breakdown but also paying taxes, and perhaps the most important ones, at the time of the audit [1].

Today, the latest advances in IT services have reached almost every segment of the economy. Both the corporate and public sector have the latest solutions that not only speed up but make processes even faster. Smart bonds are available in the range of banks, intelligent services for insurers and a well-known concept in business are smart contracts [2].

2 Taxation & Blockchain Technology

2.1 Taxation and technology

In the United States alone, the number of manually submitted returns declined from 31% to 15% between 1999 and 2004. In the US, the spread of the high-speed Internet and the digital procedures applied, such as e-declarations, have clearly promoted the spread of electronic submission of tax returns [3].

The companies themselves have realized that digitalization also affects them. Many FinTech companies offer a digital solution for different business processes. Nowadays, companies are considering the use of blockchains as forward-looking technology and as a possible future technological process. In the long-term, companies expect a much lower cost, greater liquidity, more accurate records and control processes in the long-term [4]. This process is still far ahead of technology, as current technology offers complex solutions for only partial processes.

Why would this technology be avoided in the area of taxation? How can Blockchain Technology be effectively introduced into taxation? Digitalizing taxation means converting analog processes to digital processes. The transformation involves integrating multiple digital processes into the relationship between customers and the authority. The IT mapping of the taxation process has already been solved and is widespread in both the tax administration and the corporate sector [5]. The company's internal integrity makes it possible to generate real-time data completely, so the data element at the base of the process is available at any time. The state of data itself or its change can be monitored in separate systems, and in the case of integrated systems, the relationship between data and data is visible. If we look at the data connection between two units, we are talking about a normal pear-to-pear connection. The more elements we connect to the process, the more integrated the process itself. One of the features of today's integrated systems is that each binding station is connected, but in the case of a change, the interaction between the binding points doesn't automatically occur [6]. That is, the process does not automatically follow the change of information automatically, and the information is not able to appear immediately at all station in the process. Although the process is still at a very early stage, but according to trends in recent years, speeding up digitalization is a good chance for block networks to spread in the field of taxation [7]. In order to understand the blockchains, we have to go back to the main stages of technological development. We distinguish four generations of block lengths.

Cryptocurrencies, the pioneer of bitcoin, is the first level of technology. Process levels are based on the authentication of transactions. The second generation, led by Ethereum, allows intelligent contracts to allow more heterogeneous and lighter

tokenization. Both result in extremely low energy efficiency and lower average block authentication speeds and block transactions. The third generation aims at solving the problems of scalability, speed and, energy utilization with different approaches and techniques. The fourth generation goes far beyond this faster and easier scalability, yet it is competitive from a business point of view. The simple data chain is not flexible enough to meet the corporate environment in which complex data structures are placed in the spreadsheets, the most important role in the structure is to guarantee reliability [8]. Further development of the fourth-generation block network can support enterprise applications and expand the current business-oriented portfolio of data storage, application decentralization, transparency, security, and reliability [9]. When applying blockchains, a very important circumstance must be taken into consideration. Many players in the market provide platform and technology to handle blockchains [10]. At present, there is no standard for blockchains, but of course, there is a question of whether there is a need for a uniform standard at all [11]?

The EU policy on boosting shared accounting technologies emphasizes that any regulatory approach to shared accounting technology should be innovation-friendly and follow the principles of technology neutrality and business model neutrality [12]. The EU doesn't have to regulate the shared accounting technique but must try to eliminate the obstacles to the creation of blockchains [13]. We need to distinguish between Public, Consortium and Closed chains between blockchains. Typical occurrences of the Consortium and Closed chains are chains within the organization, such as banking and interbank networks, but in the case of open chains, typically smart deals are also mentioned [14]. Returning to taxation, the process itself is roughly static and forms a linear process when the whole process of the process is considered so it is decentralized. Examining the individual points of connection, however, involving the associated points, we find centralized units. The expected completion of blockchains in the taxation process can be divided into several phases. Within chains, chains created under integrated corporate governance systems are created within companies, while open chains between the company and the authorities are expected to be mapped [15].

2.2   Processing the data

In the process, the collection, processing, storage and transmission of data is of paramount importance. In the blockchain, data is stored in so-called blocks that behave as small databases. If users add new data to the decentralized database of the blockchain, the new data will be stored in a new block [16]. When creating blocks, a chain is created, which is actually called a blockchain. The blockchain is valid if the so-called Primary Block, the first block created, starts and if all the transactions with the data are valid. From any block of the chain, there is only one straight path leading to the first block. In each block, the system stores not only the data but also all the operations within the system with the data. Transactions

executed are not carried out in such a way that actual data movement is effected between each block, but the system assigns it to the individual data in the block that stores them, to which user is entitled to possess. The system uses the digital signatures of each user to store the data stored in the blocks and determines which user is entitled to have over a dataset stored in a given block [17].

Blockchain Technology is based on a decentralized network that does not have a central entity or any other external entity that performs an external audit of transactions with data stored in it. The blockchain is not stored by a central data manager, but virtually all users are stored on their own computers. There is a special situation in data and information storage because, in the current process, companies and tax authorities are also storing taxation documents in their own systems. This circumstance raises new forms of data management and storage. Exactly the structure of the data and databases on which taxation is based. A processing and storage structure should be established that allows unrestricted access to authentication, access, and control to the actors in the chain. Blockchain can authenticate the origin, traceability and, transparency of transactions in accordance with tax requirements. In the taxation process, this provides faster administration and faster control.

At present, the process has many opportunities and challenges for the public and corporate sectors. It is necessary to set up a working group capable of measuring key areas of the whole process [18]. Ensuring that the information carried by the elements of the process can't be retrospectively modified makes it unnecessary to verify the transaction by a third party. By examining the blockchains and the technology behind them, the challenges generated by the process are highlighted, on the one hand, the transactions and distributed databases. Particular attention should be paid to the handling of private and private data, which is a special challenge [19]. As the storage and data management process change fundamentally, attention should be paid to the environment of the blockchains. If some blocks in the blockchain are also used to store personal data, the question may arise as to who is considered a data controller in this case. A data controller is primarily a person who determines the purpose of managing personal data, makes and executes decisions about it.

Since we are talking about a decentralized network that does not have a central entity that has a supervisory right over system operation and data transactions, as the blockchain is concerned, data management is practically done by individual users. Therefore, each user who blocks and data stored in the system is considered a data manager in connection with the blockchain. Later, the user who has added the data to the system receives exclusive access privileges over the data stored in the blocks, so he can determine which transactions will be used to execute the transactions. If the transaction permits the disposal of the privilege over the personal data stored in the block to another user, from which time the user who receives the data will obtain the exclusive provision over the data and thus will qualify as a data controller.

2.3   Advantages and disadvantages of the blockchains

Blockchain Technology has many advantages and disadvantages at the same time. The most basic advantages of blockchains can be divided into four main groups. These are Trust, Immutability and Transparency, Disintermediation, Lower Costs and, Greater Speeds.

Trust: the information can only be expanded and modified if all elements of the chain allow it. Third-party authentication is not required. In the field of taxation, this is reflected in the fact that changes in the data on which the statement is based will immediately change the accounted data and records, without the need to generate a separate event.

Immutability and transparency: the point is that the information can only be written to the previously existing data, meaning that the new information will only be authenticated if the previous attachments in the process authenticate the new element. This effect can appear in taxation that the tax returns are credible if supported by the supporting data and databases. When a company submits a tax return, this step is verified in such a way that the authority's acknowledgment is linked to the previous chain and thereby exchanges credentials with each other. When a company submits a tax return, this step is verified in such a way that the tax authority's confirmation is linked to the previous chain and mutually authenticates each other.

Disintermediation: No person, company, or organization either exclusively keeps the chain of information forming the entire blockchain alone. While in the present practice tax returns are available in separate information blocks at companies and the same tax returns at the tax office, but in a duplicate file, the two databases are two separate places twice. Spatial distance between stored databases without having an active connection between them. If the sender wants to change the original version, he must generate a modification document and submit it to the authority. With regard to blockchains, this all makes it simpler. On the one hand, the submitted and verified declaration as an accepted, sealed, verified transaction is distributed on each party's database. Neither party can modify the file without affecting the other party's influence immediately [20].

Lower costs and higher speeds are the expectation of the process. The lower cost is expected to be partly due to the development of IT in the long run, and the higher speed is expected to ease the chain of processes. One of the greatest expectations about blockchains is that it can provide confidence among those who do not know each other directly. At present, the data is fragmented in each process of the process, its solution is a step forward and guarantees credibility. In addition to benefits, disadvantageous factors should be highlighted. The leading players in the blockchain phenomenon share common features: unique security and reliability. At the same time, it is necessary to pay a high price: processing requires a lot of energy, causes unacceptable environmental pollution, high

transaction costs and the system is sluggish. It is hardly acceptable with the current level of development of technology and does not provide an obvious technical solution for modern financial and commercial use. Slow running time is caused by the lack of horizontal scalability. Increasing computing performance will only be done by adding new processors instead of replacing the old ones again. Another reason is the current security system of the blockchain. It is designed to prevent anyone from occupying the predominant part of the clusters by making it a non-returnable investment for others as a function of computing energy and, cost. In addition, current blockchains are only simple chains of state changes in data items [21]. Determining the current state of the data requires a full search of the chain. As a result of the system even more deceleration and resource demand. This simple solution doesn't make blockchain suitable for scientific and industrial purposes. The need for sophisticated data systems is becoming more and more challenging. In addition, security measures stop at a certain level of data, thus not guaranteeing users' security. The taxation process depends on the trigger event that caused by the tax effect. The process itself runs from the taxpayer to the tax authority. The question arises of how to safely store the data in the main book, where the tax authorities may leave many unnecessary processes but become more effective. In addition, VAT 2.0 may also appear as linked data [22]. Focusing on the internal operations of companies, it is no longer the question of whether block lengths are coming, but the effects of internal processes? When considering the processes, interaction with authorities should be explored. In addition to corporate culture, organizational networking, confidentiality of data and business risks must be ensured within the organization. In the current processes, despite the favorable practical conditions of digitalization, there is still a lot of paperwork that draws time and energy from the real tasks. However, the process can't be treated on a "black and white" basis, but must also deal with concrete cases that lead to disputes and risks even in current practice. At the same time, real-time accounting allows not only tax authorities, but also the rethinking of corporate financial planning. As the administration itself is getting faster, companies get a competitive edge. Basically, companies are already using internal processes (ERPs) for certain processes but linking them to additional areas, which increases complexity. The first step in the thinking process is to set the terms in a smart contract with the partners, which will allow the tax authorities to check more quickly [23]. Taking into account the technological possibilities and individual tax types, VAT and income taxes can be created either through automatic taxation. The implementation of functionality is largely due to technological connections [24]. For all organizations, it is of the utmost importance that the changes introduced will benefit in the long-term. In order to implement blockchain technology, further development and integration of currently available applications is required. This causes organizational changes and costs. It is by no means a question that technology has a full impact on tax administration processes, but the change itself entails costs. In addition to the cost of introducing the application, the administration model also changes, which affects the process

value of the system. The question arises whether companies can preserve or even increase the value of their processes? There is no separate process for blockchain effect measurements, but one possible way to measure artificial intelligence is the question. The positive result of technology may differ due to the diversity of business models [25]. We need to look at what business size you should use the process. Individuals and small and medium-sized businesses can't count on cost-effective returns, but they are already in large corporations. With regard to the whole process, it is possible to achieve a breakthrough success if more actors are involved in the process [26]. To do this, check the taxation process within the company processes as part of the process. Business process methods can be modeled by an index number and can be based on the possible pattern of AI measurements, and the effects of block lines can be quantified [27].

2.4 Control the process

By measuring this process, not only the interactions between the individual interfaces, but the entire process can be mapped. After quantifying all the parameters that can be considered, the processes checked by the block and the block channel can be compared and the difference between them can be measured [28]. Since not only the taxation process itself has to be examined but also the individual tax types within it, the efficiency gains for each tax item are expected to reach. This assumption can be verified when the technology will offer a practical solution for each tax category as well. One of the most important points of the taxation process is control. It is in the interest of both companies and the tax authorities that tax registers are accurate and easily controllable. The tax shortages found by the tax authorities may arise from professional error, but also from deliberate fraud. The role of blockchain technology in preventing tax evasion is raised [29]. In order for the application to appear in practice in the field of taxation, many challenges need to be answered. Beyond the technological background, the legal background is also needed. Transfer pricing within a group of companies and cross-border transactions pose a special challenge [30]. Because of blockchain technology provides real-time data in payment methods. The method used can also affect the financial processes of companies [31]. Technology is able to provide real-time data, so it may be that in the future public finances will also change the tax periods of taxation [32].

Conclusions

Focusing on the internal functioning of companies is no longer the question of whether the blockchain will arrive but the effects of the internal processes of companies? When reconsidering the processes, interaction with authorities should be explored. Within the organization, besides corporate culture, the organizational network, the confidentiality of data and the business risks that arise must be taken care of. In the current processes, despite the favorable practical conditions of

digitalization, there is still a lot of paperwork that draws time and energy from the real tasks. Artificial Intelligence can make a breakthrough in two important points. One of the key breakthroughs is that verbal tax cases are clearly classified, and the other important milestone is that, leaving human involvement, the process can be even more reliable. The introduction of the process can't be predicted in a timely fashion because of the important point. One is that the spread of blockchain systems has not yet occurred and their current usability requires high energy and a lot of costs.

On the other hand, data serving the technology can still be manipulated easily, which is a possibility of cheating. The subject "Blockchain in Taxation" is a very wide topic. Regardless of whether we are examining the entire taxation process or analyzing just one business activity within a company, many parameters need to be investigated. The usefulness of the application of technology is required through all kinds of transmitters. What happens to direct and indirect taxes, and what automation can be used by reversed taxation? From an institutional, legal and technological point of view, it is also expected that all types of taxes will only be activated step-by-step. The joint interest of the corporate and government sectors is a common step towards technology to explore the potential and limiting factors of technology. Does blockchain technology make a breakthrough in taxation?

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Project ownership and stakeholders – From a project manager's angle

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Abstract: Building and leading a company as well as managing projects has always been about managing for stakeholders. The economic world today consists of interconnected networks of customers, suppliers, communities, employees, financiers. Ownership plays a special part in the life of companies and projects. Beyond physical possession of business property it includes responsibility (even in hard times), ability to make decisions, taking control and pride in tangible results and creating value during the process. Addressing project ownership issues should fit within the general framework of the organization. By the temporary and unique nature of projects they are still performed to achieve specific goals. Projects are usually performed by temporary teams, have a non-repetitive feature and provide non-standard deliverables. The purpose of this study is to show, present and highlight the connection between project ownership and stakeholders. For this, I have taken the liberty of referring to the original stakeholder literature (mainly Freeman) and a Hungarian edition of an international standard providing guidance on concepts and processes of project management that are important for, and have impact on, the performance of projects. Stakeholder literature is added with personal observation from 20 years of work in project management. This paper is thus written with the methodology of participatory action research where my experience has been gained through direct management and/or involvement in smaller and larger projects in different roles at all affected levels (project preparation, implementation and evaluation).

Keywords: cooperation, dispersal of ownership, project owners as special stakeholders

1 Stakeholders and the issue of ownership in general

1.1   The ownership issue

Ownership plays a special part in the life of companies and projects. Beyond physical possession of business property it includes responsibility (even among difficulties), ability to make decisions, taking control and pride in tangible results and creating value during the process. Kolnhofer-Derecskei [9] finds mainstream

economic models do not take ownership into consideration. Ownership itself can refer not only to objects but can be also understood in other neighbourhood (e.g. company organization, structure) and can be linked with different socio-economic observations, as well (e.g. ownership problem, endowment effect and economy). Companies have different relationships (contacts and contracts) with many stakeholders and therefore can be seen as a set of principal-agent relationships, between themselves (as agents) and their stakeholders (as principals) [6].

Meaningful stakeholder relationships require high level permanent, active and stable cooperation. Dawes and Thaler [1] note that cooperation is positively related to the investment return on the public good and the supply of cooperation is upward sloping in case of examined groups.

1.2 Interrelationship of stakeholders and ownership

In the now classic text of the 1984 literature a stakeholder is "*any group or individual who can affect or is affected by the achievement of the organization's objectives*" [5]. The said Hungarian standard [8] defines a stakeholder as a person, a group or organization that has interests in, or can affect, be affected by, or perceive itself to be affected by, any aspect of the project. These two definitions resemble to each other, therefore, the baseline definition in this study is the reference base of stakeholders in projects.

A corporation is viewed as a vehicle for individuals to pursue their own personal projects and companies should be organized and run in ways that allow stakeholders to do precisely that, in cooperation with other stakeholders [3]. Freeman [5] depicts the moment of separation of ownership and control over a business in his "*managerial view*". He thinks ownership became more and more dispersed as banks, financial institutions, stockholders and other organizations started to finance the emergence of modern corporations. In order to be successful and competitive, managers of the firm have to satisfy simultaneously various players around the firm: owners, employees and their unions, suppliers and customers (see Figure 1):
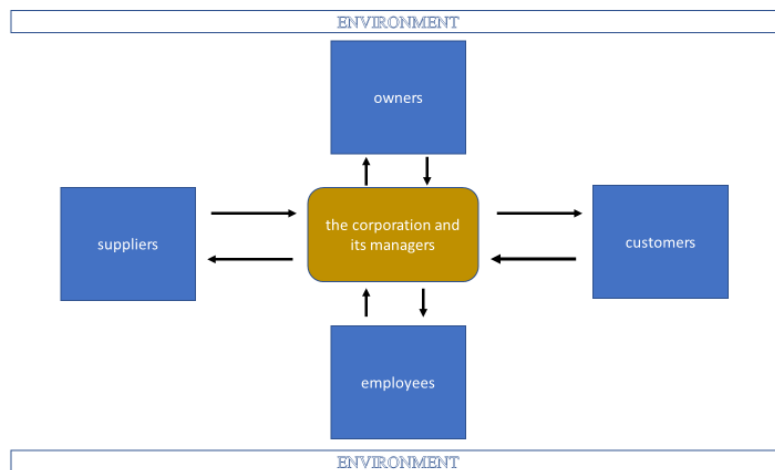
Figure 1: The managerial view of the firm

Source: Freeman, R. Edward (2010): Strategic management. A stakeholder approach. Exhibit 1.2, p. 6.

During the past decades this model has put shareholders, thus owners at the centre of the firms as the most important interest group to be dealt with. The managerial approach has focused more intensively on shareholders and creating value for stakeholders thus it can be called as an inwardly-focused view which concentrates on a single group while neglecting new and external sources of growth. According to Freeman, the world has changed since so that the stability and predictability of this shareholder approach can no longer be assured. Paying attention to only one of these groups (stockholders or financiers supplying the necessary capital) is totally untrue.

Lacking stakeholder involvement, conflicting stakeholder expectations or understanding about project functionality can often cause changes, i.e. variations or modifications from the original scope, cost, time schedule, and agreed quality in projects. [19] Needless to confirm that owners still belong to primary stakeholders, a group with high legitimacy in the company's life. Managers have to pay a special kind of attention to this group, among others and have to concentrate on creating and sustaining value for key stakeholders. The daily life of any business consists of interactions with a broad range of stakeholders, and these relationships need to be managed in a thoughtful way. Thoughtful my understanding can also be a synonym for transparent where – as Velencei [13] said – any transparent processes are considered to be easier to control and monitor. However, ownership of a corporation, especially a larger one, can easily change through mergers and acquisitions, takeovers, management buyouts etc., leaving the business vulnerable to competitive attacks, rapid market declines, takeover bids. This is called, among others, *external change* [3]. External change is

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influence from the environment that affects comfortable relationship with suppliers, owners, customers and employees.

External change can thus be understood in terms of the emergence of several new groups to the organization and the restructuring, rebuilding of old relationships of lesser importance around the corporation (see Figure 2).
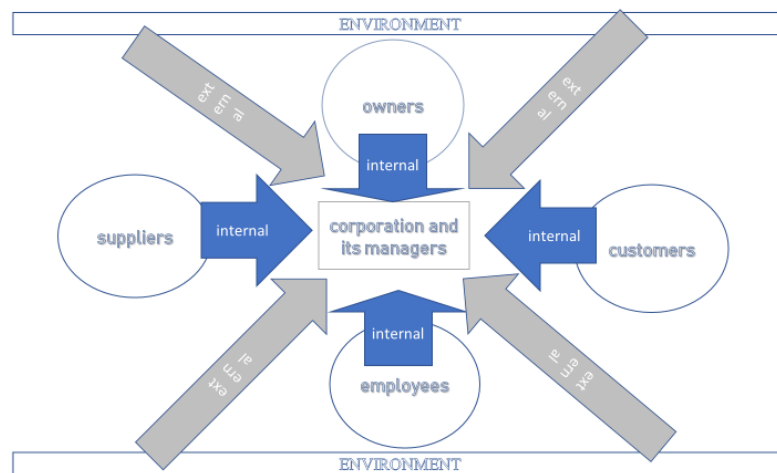
Figure 2: Internal and external change
Source: Freeman, R. Edward (2010): Strategic management. A stakeholder approach. Exhibit 1.3, p. 12.

Recently, employees and management have become significant holders of equity, particularly in the high-growth service industries (e.g. high technology and medical sciences). In many of today's leading firms it is becoming hard to distinguish between owners and employees [4]. Furthermore, nowadays there are multiple ways to finance the corporation beyond shareholders: from equity to debt, capital investments, community investments etc.

In another approach, ownership is closely related with power, especially voting power and economic power in the classical two-dimension stakeholder matrix (interest/stake vs. power). In the first point of interest, owners can devote resources in terms of voting power, e.g. voting for certain directors or voting to support or outvote management. Economic power is meant here by all conditions of having sufficient productive resources at command and at corporate level that give the capacity to make and enforce economic decisions, such as investments or Research Development and Innovation. The third classification of power (political power) in the stakeholder approach is not present here.

The stakeholder environment can be divided into three main categories [7]:

1) The *broad* environment (society, technology, economy, political and legal neighbourhood): over this a business has no or limited influence;

2) The *operating* environment consists of external stakeholders (suppliers, competitors, unions, customers, government, local communities): some influence is relevant and

3) The *internal* organization (with owners, managers and employees): they have formal ties to the firm.

Owners and ownership is therefore linked to the internal organization.

A very confusing issue could be conflicts within the ownership group, these are often conflicts between shareholders, as shareholders for control of the corporation of voice in its management. The existence of such battles demonstrates for managers that there is a substantial need to broaden the horizons and seek to include groups with alternate business views within the corporate organization. If alternatives to win-lose fights are not explored in time and adequate deepness, business opportunities may be lost leaving the firm in a less favourable market position [5].

Building and leading a company has always been about managing for stakeholders. The business world today consists of interconnected networks of customers, suppliers, communities, employees, financiers. The company that manages for stakeholders at the expense of other stakeholders cannot sustain its performance [3].

Stakeholder collaboration to stakeholder management could be preferred in which collaboration is integrated, focuses on building relationships, emphasis is on creating opportunities and mutual benefits, is linked to long term business goals. Based on Svendsen [12] it is also a coherent approach driven by business goals, mission, values and corporate strategies.

Owners have a clear financial stake in the business in the form of stocks, bonds etc. and they expect certain financial return on them. The stakes of owners differ by the type of owner, financial preferences and moral preferences, social and environmental preferences. It makes thus sense to talk about financiers owing, they have connected and real time responsibility for the use of their property and assets. Financiers or investors usually seeks for maximum profit on the investments made. At the same time, any capital investments are connected not only with expectation of obtaining the income and profit but also with constant danger of risky losses. [20] The stakes of each stakeholder group are multifaceted and inherently connected to each other [2]. Managers have a responsibility to act as reliable agents to multiple stakeholders rather than just the stockholders. This opinion is considered as an extended agency theory [2]. In his approach, Freeman depicts ownership in its very physical state in terms of purchase, takeover, control and holding. I see ownership from a different angle: as partnership in which an organization is able to negotiate any kind of emerging problem or obstacle with its internal and external stakeholders. Managers can thus understand the various direct and indirect linkages between the various stakeholders [15].

The relationship among the organization and its stakeholders can also be described as a kind of coach and coachee contact from the perspective of their respective competences and a particular type of the coaching process [14]. It is justified that there is no conflict between serving all stakeholders and providing outstanding returns for the shareholders [4].

2 Simultaneously on the project level…

2.1   A project-focused approach to stakeholders

Project owners should be seen as special stakeholders who have vast interest in the success of the project and within the environment the project operates. Owners have both control and responsibility for cost and income related to the project. This special stakeholder who has both control and financial responsibility has incentives and tools to maximise the value creation related to the source [10]. Project stakeholders, including the project organization, should be described in sufficient detail for the project to be successful. A typical breakdown of project stakeholders is shown in Figure 3:

Figure 3: Project stakeholders
Source: Hungarian Standard MSZ ISO 21500: 2015, page 25, figure 4.

Different players in the figure are clear and speak for themselves. One category should be however described in further detail: suppliers is an umbrella phrase for all suppliers, subcontractors, commissioned experts who contribute to the project by supplying different resources. Stakeholder interfaces should be managed within the project through project management processed described in the standard.

According to Olson et al. [10] project ownership can take the form of

- financier (who provided funds to the project, either using own funds or coordinating funds from other sources)

- ultimate owner of financier (e.g. private consultancy firms, government, inhabitants)

- operators: organizations responsible for operating the project result (facility management, service provider, maintenance etc) and

- value generators: represent the value generating activity that utilises the project delivery (e.g. end users).

Olsson et al [10] have indicated in their study that not all examined project have a single, well-identifiable owner (especially in large governmental projects, e.g. infrastructure, traffic). However, stakeholder management can be still considered a key area in the management of projects [16]. To understand the hidden power and influence of various stakeholder is a critical skill for successful project managers [17].

2.2 Stakeholders in project processes

The said international standard identifies the recommended project management (PM) processes to be used during a project. These processes are appropriate to be applied to projects in all kind of organizations. PM processes may be viewed from two different perspectives, namely as:

1. Process groups: initiating, planning, implementing, controlling and closing and

2. Subject groups: integration, stakeholder, scope, resource, time, cost, risk, quality, procurement and communication.

Stakeholders as subject groups come into the picture in the initiating phase where the task is to identify stakeholders. Initiation is normally used to launch a project phase or the project itself and to define the project objectives. Stakeholders are also affected during implementation period in form of managing stakeholders. This stage is usually used to perform PM activities and to support the provision of deliverables, as to the actual project plan. When identifying stakeholders the task is to determine individuals, groups or organizations affected by or affecting the project in both internal and external categories and to document relevant information regarding their interest and involvement. Primary inputs are the project charter and the project organization chart, a stakeholder register is considered relevant primary output. [8] During the management of stakeholders the task is to give appropriate understanding and attention to stakeholder needs, concerns, expectations and resolving issues. Primary inputs are the project plans and the stakeholder register, change requests (documentation defining a proposed alteration to the project) are considered relevant primary outputs. [8]

In another approach, strategic stakeholders are those who affect project portfolios i.e. collections of projects conducted under the sporsorship and/or management of a specific organization and compete at the same time for scarce resources. [18]

2.3   Project ownership

Addressing project ownership issues should fit within the general framework of the organization. By the temporary and unique nature of projects they are still performed to achieve specific goals. Projects are usually performed by temporary teams, have a non-repetitive feature and provide non-standard deliverables. Project ownership in physical terms (possession, property and rights) is relevant in the following environments:

1. *External*: factors outside the organizational boundary may have impact on the project by imposing constraints or risks. They are often beyond the control of PM, they should still be considered,

2. *Organizational*: factors arising out of current and future operation, calculated benefits and opportunities (e.g. new market demand or niche, new legal environment) as well as strategy, structure, applied technology, resources, organizational structure etc.,

3. *Project*: factors to be calculated with at PM level (e.g. business case, financial investment alternatives, goals and benefits, strategic alignment, PM maturity, social and environmental impact etc.

Project ownership should escort the project during the entire project life cycle: during initiating, planning, implementation, controlling and closing (Figure 4).
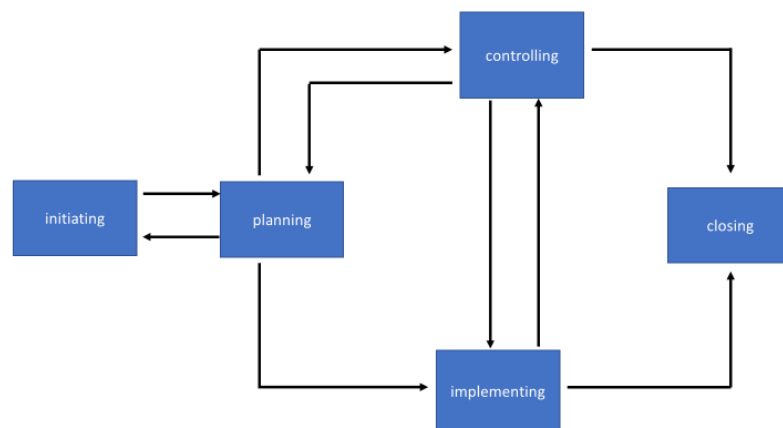
Figure 4: Process groups' interaction
Source: Hungarian Standard MSZ ISO 21500: 2015, page 35, figure 5

Project ownership in management terms creates a framework in which a project or different projects within and organization are directed and managed. It also includes areas that are specifically related to project activities, such as:
- PM management structure,
- PM policies, processes and methodologies to be applied,
- limits of authority in decision making,
- stakeholder responsibilities and accountabilities and
- other interactions such as reporting and escalation of risks.

Normally, a project owner focuses on the business case and has responsibility for both project delivery and benefit realization. A further type of project owner is found who is mainly concerned with supporting the project manager and enabling project delivery [11]. Project ownership in my terms also includes constant development of competencies. These competencies might include technical competencies (e.g. PM and PM processes), behavioural competencies (e.g. personal relationships within the project) and environmental competencies related to the management of the project within a given organization and external environment. Each project team, therefore, should be comprised of personnel capable of applying their knowledge and experience to provide project deliverables.

Conclusions

Ownership, especially project ownership cannot ultimately be separated from stakeholders, owners are considered one of the stakeholder groups. Organizations and projects are managed by managers in favour of all stakeholders (including owners) in form of created value. Project owners should therefore be seen as special stakeholders who have vast interest in the success of the project and within the environment the project operates. Owners can be at the same time both influencers and stakeholders [6]. Naturally, owners step up as investors in the company: they, among others, provide specific capital needed to finance operations and investment. Recently, financiers have replaced *"traditional"* owners, financing parties are often used as project owners. Project ownership is not linked to one single form, it can take various forms (financier, ultimate owner, value generator etc.)

Acknowledgement

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Development and implementation of the numerical model for predicting the values of ecological footprint, based on the Monte Carlo methodology

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Abstract: The impact of human activities on the environment can be observed through the ecological footprint - the biologically productive area of land and water that is needed to satisfy human demands. In order to achieve and maintain sustainability, Earth's natural capital needs to be preserved. Thus, it is of high importance for scientific and general community to analyze and predict the ecological footprint in order to successfully manage natural resources and protect the environment. The aim of this paper is to develop and implement a numerical model based on Monte Carlo methodology, for predicting the values of ecological footprint (EF). The model is based on systematic analysis of six input variables: (1) Rural population, (2) Urban population, (3) GDP per capita, (4) Energy use, (5) Electric power consumption, (6) Electricity production, and one output variable which is the total ecological footprint of consumption. The dataset included data from European, North American, South American, Asian and African countries, as well from Australia. Predicted values from the model were then compared with the measured ones, in order to verify the accuracy of the model.

Keywords: ecological footprint, Monte Carlo, numerical model

1 Introduction

Sustainability has become a major concern of today's society. All countries worldwide need to deal with environmental problems [1] especially those affecting climate change. One way to access the Earth's sustainability is by calculating the Ecological Footprint.

The Ecological Footprint can be defined as a technique that measures the limits of our planet and the extent to which humanity is exceeding those limits [2]. Basically, the ecological footprint analyses the relation between the demand and supply of environmental resources, where the EF considers the demand that humanity places on the biosphere, while biocapacity presents the amount of biologically productive area that can be used for the needs of humanity [2]. Environmental resources here include: cropland used for providing plant-based foods and fibers, grazing land for providing animal products, fishing grounds for fish products, forests for timber and forest products, uptake land for the neutralization of anthropogenic carbon dioxide emissions, and built-up land for infrastructure [2].

Presenting it simple, the ecological footprint represents the material balance of the Earth, observed as closed system. This way, a state of ecological deficit occurs when the demand placed on the biosphere exceeds the region's biocapacity. Unfortunately, at the global level, an equivalent of 1.7 Earths is used to provide the present resources that humanity needs [3].

Industrial activities are based on smart and automated industrial concepts, and in most contemporary conditions, on Industry 4.0 concept which includes cyber-physical systems, the Internet of Things, cloud computing artificial intelligence, and cognitive computing. However, even such processes require resources and especially energy. As industry becomes more environmentally friendly, consequently it also becomes more energy dependent. This way, the pollution and environmental burden is now transferred from the production to the consumption sphere, especially when it comes to energy consumption.

The aim of this research is to develop adequate prediction model for Ecological Footprint estimation, based on energy related parameters, and then validate the model by using a Monte Carlo simulation. The EF data is already available in different publicly available data sources, so the main motive here is not the calculation itself, but accessing the dependencies between the socio-demographic and energy related inputs, and the total Ecological Footprint of consumption.

The paper is organized as follows. Section 2 presents a review of the literature, while Section 3 describes data and methodology used in this research. Section 4 shows the obtained results from both models. The last section presents conclusions of this study.

2 Literature review

In reference [4], author used a Bayesian linear regression model and Markov Chain Monte Carlo for simulation to predict the ecological footprint of 140 nations. The results indicate that urbanization level along with the world system position positively affect the ecological footprint per capita, while income is negatively related. Despite these results, the author emphasized the importance of a longitudinal approach, rather than a cross-sectional one which was used in the study.

In a paper [5], the authors used the Markov chain to estimate the ecological footprint of Beijing. The results indicated that consumption patterns and environmental policies kept ecological footprint stable, while energy consumption was the biggest contributor to ecological footprint. Moreover, population growth and urbanization level impact the intensity of ecological footprint. The authors suggested the improvement of urban design, energy efficiency improvements, and changes of consumption patterns.

In [6] the environmental sustainability of China was investigated and predicted future ecological footprint using the linear autoregressive integrated moving average method (ARIMA) and the artificial neural network (ANN). Their results indicate that the ecological footprint in China will continue with the rising trend, while the overall ecological security is predicted to continue to worsen. The authors also state that a combination of ARIMA and ANN models can make the prediction results more reliable [6].

The authors in [7] predicted ecological footprint in Europe using Proportional-Odds Cumulative Logistic regression, based on innovation factors, the degree of economic freedom, and whether or not the country is a member of European Union. Their analysis indicated that ecological footprint depends on the employment in foreign controlled enterprises, eco-innovation index, and region. Moreover, it is concluded that Europe's ecological footprint from 2006 to 2014 decreased, while the biocapacity increased. It is also found that Luxembourg had the highest ecological footprint, followed by Denmark and Estonia. On the contrary, the lowest ecological footprint was found for non-EU countries characterized by a lower economic development, with the lowest values of ecological footprint in Moldova and Albania. Among the EU members, Romania, followed by Bulgaria, had the lowest ecological footprint level [7].

In paper [8], the authors analyzed the ecological footprint of Beijing using the support vector machine (SVM), where a novel model was introduced based on which the prediction of ecological footprint was made for the period from 2016 to 2020. The results indicate that SVM achieved higher prediction accuracy than BPNN. The ecological footprint of Beijing is indicated to increase by 2020 [8].

3 Data and methodology

3.1 Data

The ecological footprint data, to be used for analysis and modeling, was downloaded from the Global Footprint Network [3]. The data comprises of six land use types: (1) Cropland, (2) Grazing land, (3) Fishing grounds, (4) Forest Land, (5) Build-up land, and (6) Carbon uptake land. Ecological footprint can be viewed from the aspect of production (EF of production), and consumption (EF of consumption). The ecological footprint of production can be calculated as following [2]:

$$EF_p = \sum_i \frac{P_i}{Y_{N,i}} \cdot YF_{N,i} \cdot EQF_i = \sum_i \frac{P_i}{Y_{W,i}} \cdot EQF_i \qquad (1)$$

Where P is the amount of each primary product i harvested in the nation, $Y_{N,I}$ is the annual average yield for the production of commodity i, $YF_{N,i}$ is the country specific yield factor for the production of each product i, $Y_{W,i}$ is the average world yield for commodity i, and EQF_i is the equivalence factor for the land use type producing products i [2].

The ecological footprint of consumption can be calculated as follows [2]:

$$EF_C = EF_P + EF_I - EF_E \qquad (2)$$

Where EF_P is the ecological footprint of production, EF_I is the imported commodity flow, and EF_E is exported commodity flow [2].

The ecological footprint of consumption is the most commonly reported EF [2]. It is also worth noticing that the Ecological Footprint is expressed in global hectares (gha) [2].

Besides the total ecological footprint of consumption, other parameters were also collected for the analyses: Population number (urban, rural, and total), GDP per capita (in constant 2010 USD), Energy use (kg of oil equivalent per capita), Electric power consumption (kWh per capita), and Electricity production (% of total) from six different sources (coal, hydroelectric, natural gas, nuclear, oil, and renewable sources). This additional data was downloaded from World Bank reports [9]. Based on different Electricity production sources, six datasets were created, next to the original dataset which consists of 3133 datalines, and involves 72 countries from all over the world for the period of 1972-2014.

In this paper, the dataset containing the total EF of consumption as the output variable, and Population numbers, GDP per capita, Energy use, Electric power consumption, and Electricity production from coal sources, as input variables, was used for the analysis. This dataset consist of 1353 datalines, and involves only

those values for which the Electricity production from coal sources exceeds 4.99%.

The purpose of this study is to predict the behavior of the Ecological Footprint based on different parameters. Hence, the total Ecological Footprint of consumption represents an output variable, while socioeconomic and energy related parameters represent the input variables.

3.2 Methodology

Correlation analysis was firstly performed in order to access the existence and strength of the linear relationship between variables. Then, a multiple linear regression model was developed, and a model equation was formed which was later used for further analysis. Multiple linear regression analysis creates a relation between the input variables (predictors) and the dependent variable, and can be represented using the following equation [10]:

$$Y_i = \beta_0 + \beta_1 x_{i1} + \beta_2 x_{i2} + \ldots + \beta_{p-1} x_{i,p-1} + \varepsilon_i \tag{3}$$

Where Y_i is the dependent variable, β_0 represents the intercept, β_1 is the coefficient of the independent variable, x_i is the predictor variable, and ε_i is the random error [10].

An artificial neural network model (ANN) was also formed in order to compare and evaluate the best prediction performance between nonlinear (ANN) and linear (MLRA) modeling. The multilayer perceptron is a type of artificial neural network that was used, which consists of input layers, hidden layers, and output layers [11]. The neurons are interconnected except the neurons that are in the same layer. The networks works in a way that the input layer receives the information, then it multiplies the received values by weights, and passes the information to the hidden layer which processes it. Lastly, the output layer makes predictions [12].

Lastly, a Monte Carlo simulation was used to validate and to derive final conclusions on the efficiency of each model for predicting the Ecological Footprint. The analyses were performed using SPSS v.24, and Distribution Analyzer software.

4 Analyses and results

First, a correlation analysis was performed for all variables, excluding Electricity production from all other sources, except from coal. The results of correlation analysis are represented in Table 1.

The correlation analysis indicates that the strongest relationship occurs between the Total Ecological Footprint (TEF) and Urban Population (UP) (r=0.893, p<0.001). Moreover, there is a weak relationship between the total ecological footprint and Energy Use (EU) (r=0.180, p<0.001), as well as between TEF and Electricity production from coal sources (EPCoal) (r=0.263, p=0.001). There is no statistically significant relationship between TEF and GDP.

Based on the correlation analysis and literature findings, this analysis involves (1) Urban population, (2) Energy use, (3) GDP, and (4) Electricity production from coal sources, as input variables, and (5) Total Ecological Footprint as an output variable. Previous research indicates that the GDP per capita is an important factor which can have a valuable impact on sustainability [13,14,15] hence, this parameter was also retained for the analysis.

Table 5 Correlation analysis results

Correlations		TEF	UP	GDP	EU	EPCoal
TEF	r	1	.893**	.013	.180**	.263**
	p		.000	.635	.000	.000
	N	1353	1353	1353	1352	1353
UP	r	.893**	1	-.168**	-.064*	.291**
	p	.000		.000	.019	.000
	N	1353	1353	1353	1352	1353
GDP	r	.013	-.168**	1	.805**	.008
	p	.635	.000		.000	.759
	N	1353	1353	1353	1352	1353
EU	r	.180**	-.064*	.805**	1	.088**
	p	.000	.019	.000		.001
	N	1352	1352	1352	1352	1352
EPCoal	r	.263**	.291**	.008	.088**	1
	p	.000	.000	.759	.001	
	N	1353	1353	1353	1352	1353

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

r – Pearson Correlation, p – Sig. (2-tailed), N –number of datalines

TEF - total Ecological Footprint, UP - Urban Population, RP - Rural Population, GDP - GDP per capita (constant 2010 USD), EU - Energy use (kg of oil equivalent per capita), EPC - Electric power consumption (kwh per capita), EPCoal - Electricity production from coal sources (% of total, only values above 4.999%).

4.1 MLRA

In order to predict the values of Ecological footprint, a Multiple Linear Regression Analysis was performed. The analysis included the total ecological footprint as dependent variable, and four predictors: Electricity production from coal sources, GDP per capita, Urban population, and Energy use.

The results of the analysis indicate that the Electricity production from coal sources, GDP per capita, Urban population, and Energy use explain 85.6% of the variance (r^2=0.856, p<0.000). Table 2 presents the results of the MLRA.

The regression equation is:

$$Total\ EF = -1.643 \cdot 10^8 + 6.579 \cdot UP - 3061.341 \cdot GDP + 88477.866 \cdot EU - \quad (4)$$
$$717260.214 \cdot EPCoal$$

Table 6 Results of MLRA

Coefficients[a]						
Model	Unstandardized Coefficients		t	Sig.	Collinearity Statistics	
	B	Std. Error			Tolerance	VIF
(Constant)	-1.643E8	1,491E7	-11.015	.000		
UP	6.579	.080	82.181	.000	.879	1.137
GDP	-3061.341	682.664	-4.484	.000	.338	2.961
EU	88477.866	5135.478	17.229	.000	.343	2.915
EPCoal	-717260.214	287439.40	-2.495	.013	.902	1.109

r =0.925, r^2=0.856, F=1999.499, p<.001.

    a. Dependent Variable: total EF
    b. Predictors: (Constant), Urban Population (UP), GDP per capita (GDP), Energy use (EU), Electricity production from coal sources (EPCoal)

Figure 1 shows the scatterplot of the regression adjusted predicted values of total Ecological Footprint, and actualy measured values of total Ecological Footprint. The data fits the model well with r^2=0.853.
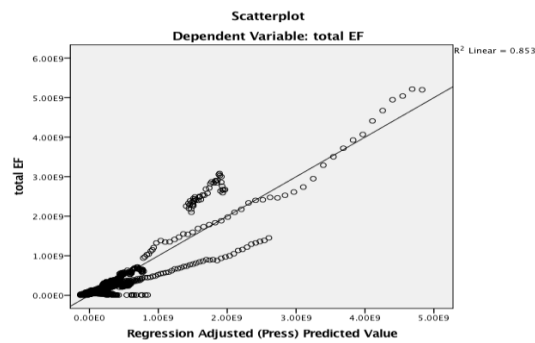
Figure 1 The scatterplot of the MLRA

4.2 ANN

An artificial neural network method was developed and compared to the MLR model [16]. The dataset was first divided into 70% training and 30% testing set, and then the Multilayer Perceptron method was applied. Sigmoid activation function was used. Figure 2 shows the layers of the network.
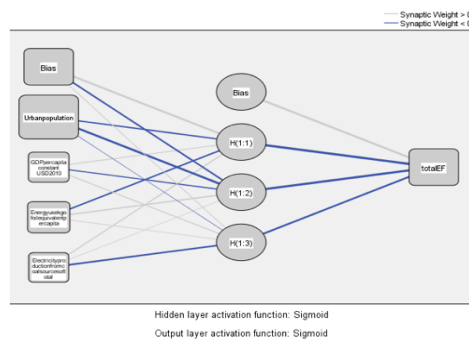
Figure 2 The architecture of the ANN

Regarding the importance of each input variable, Urban population is observed to be of highest importance, followed by the Energy use, GDP per capita, and Electricity production from coal sources (Table 3).

Table 7 Independent variable importance

	Importance	Normalized Importance
Urban population	0.821	100.0%
GDP per capita (constant USD 2010)	0.045	5.5%
Energy use (kg of oil equivalent per capita)	0.112	13.7%
Electricity production from coal sources (% of total)	0.022	2.7%

4.3 Testing the prediction potential of both models

In order to access the prediction potential of prediction models, both ANN, and MLRA models have been tested on a dataset including data only regarding China. China was selected for this experiment because of excellent model fitting. Figure 3 shows the actual and predicted values of the total Ecological Footprint. As observed, the prediction potential of the MLR model is better than the ANN model, but both models can still be effectively used for Ecological Footprint prediction.
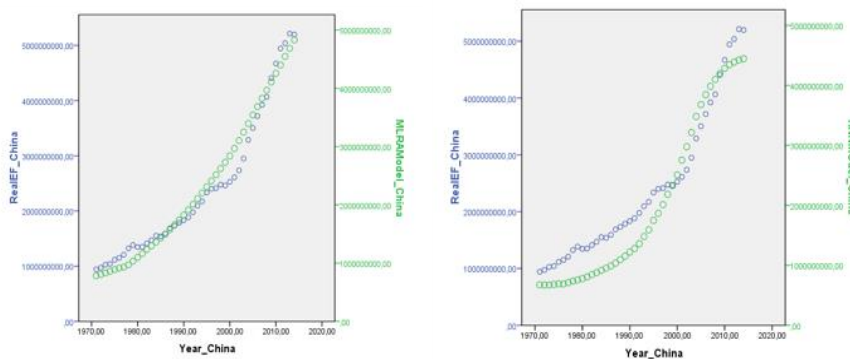
Figure 3 Prediction potential of the models for China

4.4 Monte Carlo Simulation

The process of making predictions necessarily involves a significant uncertainty which can be explained by using probability distributions. This way the variables can have different probabilities that different outcomes may occur. In doing so, Monte Carlo simulations can be performed. The first step of Monte Carlo analysis is to define the most suitable distribution of each variable. Figure 4 shows these distributions. Based on defined distributions, random values for all input variables were generated. Using the developed prediction models, values of the dependent variable Y (EF) were calculated for all randomly generated inputs.

From Fig. 4 it can be observed that Urban population variable and total EF variable best fit Pearson family distributions, while GDP per capita fits the Negative Exponential distribution. The energy use variable and the electricity production from coal sources best fit the Johnson family distribution.

(X1) UrbanPopolation
Pearson Family (16.6579, 1.49006, -0,095659, 3,429257) fit to Ln(X-0)

Sample Size = 1353
Average = 48253962,4
Standard Deviation = 89587798,8
Skewness = 3,92
Excess Kurtosis = 18,97

Test of Fit: p-value = 0,9535
(SK All) Decision = Pass
(SK Spec) Decision = No specs

256528,00 371277917,50 742299307,00

With 95% confidence more than 99% of the values are between 224674,22 and 1003185039,18

(X2) GDP per capita
Negative Exponential Distribution (9.34693, 1.91852) fit to Ln(X-0)

Sample Size = 1353
Average = 21058,899
Standard Deviation = 16961,882
Skewness = 0,43
Excess Kurtosis = -0,82

Test of Fit: p-value = 0,7491
(SK All) Decision = Pass
(SK Spec) Decision = No specs

237,8100 39156,6700 78075,5300

With 95% confidence more than 99% of the values are between 42,4859 and 71898,1158

(X3) Energy use
Johnson Family (7.6037, 1.80412, 0,267623, 0,195729) fit to Ln(X-0)

Sample Size = 1352
Average = 2890,371
Standard Deviation = 2236,646
Skewness = 1,10
Excess Kurtosis = 1,06

Test of Fit: p-value = 0,1511
(SK All) Decision = Pass
(SK Spec) Decision = No specs

180,7400 6602,3150 13023,8900

With 95% confidence more than 99% of the values are between 214,0304 and 10895,9479

(X4) energy from coal
Johnson Family (3.34197, 0.76676, -0.30266, 2.06286) fit to Ln(X-0)

Sample Size = 1353
Average = 36,721
Standard Deviation = 24,641
Skewness = 0,68
Excess Kurtosis = -0,59

Test of Fit: p-value = 0,8198
(SK All) Decision = Pass
(SK Spec) Decision = No specs

5,0000 52,4000 99,8000

With 95% confidence more than 99% of the values are between 5,2186 and 99,7286

(Y) total EF
Pearson Family (18.4851, 1.45464, 0,216805, 3,354003) fit to Ln(X-0)

Sample Size = 1353
Average = 318080000
Standard Deviation = 650180000
Skewness = 3,93
Excess Kurtosis = 17,65

Test of Fit: p-value = 0,9777
(SK All) Decision = Pass
(SK Spec) Decision = No specs

1238000 2.607 10^9 5.212 10^9

With 95% confidence more than 99% of the values are between 2570056,0785 and 8222987912,0876

Figure 4 The distribution of each variable

After the Monte Carlo simulation, and based on the MLR equation, the predicted values of total EF were calculated, and are shown in figure 5.

Figure 5 The predicted values of total EF of consumption per capita

Conclusions

Ecological Footprint is the measure of the human activity toward further progress, and also toward further exhausting of the biological potential for renewal and

recuperation. This fact makes EF an important part of sustainability, and hence a critical factor in improving ecological conditions worldwide.

In this research, EF was not calculated, but rather its dependence on important inputs was assessed. Two models were created, MLRA and ANN, and further used for making predictions of the total Ecological footprint of consumption, based on the GDP per capita, Energy use, Urban population, and Electricity production from coal sources. Monte Carlo Simulation was used for the validation of both models.

The numerical models developed in this research are proved to be efficient for predicting the Ecological Footprint, based on observed importance of potential inputs. The Multiple Linear Regression model performed slightly better than the ANN, with more accurate predictions.

Acknowledgement

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Modelling interconnection between provision under IFRS9 and countercyclical capital buffer

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Abstract: Impairment recognition according to the International Financial and Reporting Standards changed significantly in 2018 with the introduction of IFRS 9. In this paper I am modelling the interconnection between provision under the new IFRS 9 standard and countercyclical capital buffer of prudential regulation. The recently introduced IFRS 9 impairment model is closely related to the economic cycle. I am modelling the effect of macro environment to the allowance and going to compare it with regulatory mechanism of countercyclical capital buffer.

Keywords: model, impairment, IFRS 9, economic cycle, countercyclical buffer

1 Introduction

In the last few decades, significant changes appeared in the field of financial regulation. Some of them are related to the increasing complexity and volume of financial deals and exposures, and interdependencies between different sectors and entities. Others are consequences of the last big financial crisis, which generated a regulatory dumping all over the world. The sweeping changes of financial infrastructure have remarkable effects to the "real" economy as well. Great parts of the most relevant developments are connected to the reserving capability and reserves of the banks both from prudential - solvency capital - and accounting - allowance - sides. Of course, there should be relevant and significant differences between the prudential and accounting regulations (Borio and Tsatsaronis 2005).

The update of the International Financial and Reporting Standards (IFRS) is one of the main improvements at international level. Inside IFRS the biggest impact might be caused by the IFRS 9 for financial sector, the new standard related to the classification, measurement and accounting of financial instruments.

2 Scope of the paper

In my current paper I am examining the effect of the IFRS 9 standard's impairment model effective from 2018. I am comparing the results with the old standard of IAS 39. Finally, I am looking at the interconnection between countercyclical buffer and IFRS 9 impairment amount within macroeconomic circle.

The explanation and justification behind the revision of the IAS 39 impairment models was that the old accounting standard recognized the credit loss with delay and less in amount as it is needed.

According to these I am examining two hypothesises, one is related to the timing and one is related to the amount of allowance recognition. The first hypothesis is whether the IFRS 9 will recognise the impairment loss earlier and the second hypothesis is that the IFRS 9 will recognise higher impairment amount compared to IAS 39.

Old IAS 39 standard is based on incurred loss model (Tardos 2005, Szabo 2005), which means that only already "incurred" loss could be taken into account in impairment calculation, while according to the new standard there is an expected loss model (IASB 2014). It means that future losses based on expectations about past or current circumstances - with forward looking - should be included as well. This change is intended to resolve the timeliness issue of the former standard. The shortfall of the impairment amount is resolved with the requirement referred as 'staging rules'. Staging rules mean that when there is a significant change in credit risk after initial recognition of the financial assets, than the entity should calculate the expected credit loss for the full lifetime of the instrument instead of for only 12 months.

Definition of significant credit risk increase after initial recognition includes qualitative and quantitative criteria as well. Qualitative criteria consist of day past due, work-out, forbearance and early warning indicators, while quantitative criteria are connected to the rating systems as change of rating grade and probability of default since initial recognition (Chawla et al. 2016).

In that sense the macroeconomic circumstances are getting an important role in IFRS 9 through the comparison of initial and current credit risk expectations, which could be the driver of impairment as a systematic factor. As generally there is a big uncertainty in the estimation of macro circumstances, it is worth to analyse the effect of a macro shock to the impairment amount.

Finally, I am examining the IFRS 9 with the interaction of Basel III prudential rules especially with countercyclical capital buffer and aiming to highlight the combined effects of the prudential and accounting rules (Novotny-Farkas 2016).

3 Modelling the process of impairment

In this part, I am investigating the effects of the new impairment model on a hypotatic portfolio with characteristics - based on reasonable judgement - described in chapter 3.1 *Exogenous variables*. The modelling process is depicted by the following diagram:
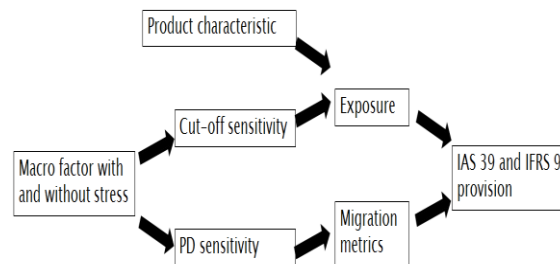
Picture 1 Modelling process

This modelling process is a deterministic calculation. The outcome of the model is the amount of provision according to IAS 39 and IFRS 9 for sequence of periods with different macroeconomic status. The final provision of a given period is determined by the current and future exposure of the deals in the portfolio multiplied with loss given default and default probabilities coming from migration matrix (see details later in Table 4). Quantity of accepted deals is given by the cut-off sensitivity of the financial entity. Cut-off sensitivity is determined by the macro factor. Product characteristics and migration matrix are influenced by the macro factors as well. It is worth to note that the cut-off sensitivity is not a crucial part of the sub-model, so the conclusions will not change, if it is ignored from the model.

3.1   Exogenous variables

Before showing the steps of the calculation process, I am introducing the exogenous variables and the simplifications used in the model.

Exogenous variables and related simplifications are the following:

- Unconditional probability – so where macroeconomic circumstances are still not incorporated - is constant at 10% for all rating grades.

- Unconditional acceptation rate is constant 80%, rejection rate is 20%.

- Loss given default (LGD): loss recognized after default. Constant value of 10% is used.

- Amortisation of deals' exposure (principal balance): linearly up to the maturity. Default maturity is 5 years. It means, that the exposure of the given deal is 100, 80, 60, 40, 20 in the upcoming years after draw down.

- Applicant: quantity of potential applicants is constant at 100.

- Migration matrix (M0,1): in the calculation the following cumulative unconditional migration matrix is used:

Table 1 Migration matrix

t0->t1	Rating A	Rating B	Default
Rating A	0,7	0,9	1
Rating B	0,2	0,9	1
Default	0	0	1

It means that there are only two non-default rating grades and one default category. Cumulative values mean that the migration probabilities are cumulated from the first value in each rows. To exclude the effect of different rating grades, I am setting the direct default probability to the same level, which is 0,1 as 1 minus 0,9.

- Staging rules: At initial recognition all of the exposures are in rating A. During modelling I will use a simplified staging criteria, namely if the exposure migrated from rating A to rating B, then the exposure will be in stage 2 and lifetime expected loss has to be calculated instead of 12 months' one.

- Macro factor: As a systematic factor, it is the state of the economy in the given year. One baseline and one stress scenario is used during modelling with the following standard normally distributed variables:

Table 2 Scenarios

Time period in year	1-9 period	10	11	12	13	14	15-20 period
Baseline scenario	1	1	1	1	1	1	1
Stress scenario	1	-1	-1	-1	0,5	0,5	1

The economic environment in case of the baseline scenario is a constant mild expansion. 1 is the value of the standard normal distribution meaning the 85th percentile of the possible outcomes. After the 9th period there is a shock in the stress scenario, where the -1 means the 15th percentile of the possible outcomes. After the 12th period the state of the economy starts to converge to the baseline scenario.

- The cut-off sensitivity (acceptance rate of applicants as a new debtor) is set to 10% and migration matrix – so PD – sensitivity is set to 10%. During the modelling process, the change of the sensitivity does not modify the final results.

3.2 Endogenous variables

As described above, the major interactions are between PD and macro factors, and between acceptation rate and macro factors.

For the dependency of the PD and the acceptation rate Vasicek formula (1) is used:

$$p_A(X) = \Phi\left(\frac{\Phi^{-1}(\bar{p}_A) - \sqrt{\rho_A}X}{\sqrt{1 - \rho_A}} \right).$$

(1)

The X is the macro factor with standard normal distribution and the p_A is the correlation between macroeconomic factor and unconditional PD, and between macroeconomic factor and acceptation rate. $P_A(X)$ refers to the conditional PD. Acceptation rate is calculated on the same way as conditional PD, but with different correlation factor to the systematic macro factor (Janecsko 2004).

If the conditional PD value has been already calculated – as defined above -, it can be used to adjust the unconditional migration matrix to get the conditional migration matrix of the given year. The adjustment process of the unconditional migration matrix with conditional PD values (2) looks like the following (named as z-shift adjustment):

(2)
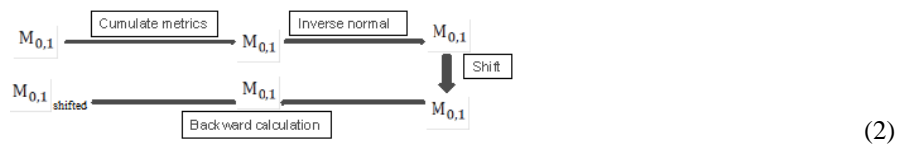
Where $M_{0,1}$ is the unconditional migration matrix (Table 3):

Table 3 Structure of the migration matrix

$$M_{0,1} = \begin{pmatrix} m_{1,1} & m_{1,2} & \cdots & m_{1,d} \\ m_{2,1} & m_{2,2} & \cdots & m_{2,d} \\ \vdots & & \cdots & \\ m_{d-1,1} & m_{d-1,2} & \cdots & m_{d-1,d} \\ 0 & 0 & \cdots & 1 \end{pmatrix}$$

If the conditional migration matrix - adjusted with the conditional PD value - is given for all years, then the value of the exposures in year t after initial recognition (4) can be calculated as (Gruenberger 2012):

$$M_{0,t} = M_{0,1} \cdot M_{1,2} \cdot \cdots \cdot M_{t-1,t}$$

(4)

Having this result, the given exposure can be classified into rating A, rating B or in default categories. In case of non-default rating grades, the impairment under IAS 39 is calculated based on the loss of the previous year. Under IFRS 9, if the exposure is in rating A, then according to my assumption, impairment has to be calculated in line with the next 12 months' expected credit loss. If the exposure is in rating B, impairment has to be calculated for the whole lifetime (Volarevic et al. 2018). In case of default, I suppose that the exposure will be written down to the appropriate recovery rate (1-LGD) under both standards.

Based on this deduction, impairment formulas look like the followings:

Table 4 Calculation types

Type of impairment calculation	Calculation formula
IAS 39 Incurred loss	LGD * conditional(t-1)PD * Exposure
IFRS 9 (stage 1) 12 months' expected credit loss	LGD * conditional(t)PD * Exposure
IFRS 9 (stage 2) Lifetime expected credit loss	$\sum$LGD * conditional(t)PD(t) * Exposure(t), where t goes from the current year up to the final maturity of the deal
IFRS 9 expected credit loss	IFRS 9 (stage 1) 12 months' expected credit loss + IFRS 9 (stage 2) Lifetime expected credit loss

4 Results of the impairment model

After the calculation with the model introduced in section 3. *Modelling the process of impairment*, the expected results have been reached. According to this, the allowance values in IAS 39 are less than in IFRS 9. In case of economic changes, the velocity of impairment correction in IAS 39 lags behind that in IFRS 9. So it seems that both hypothesises are proved to be true.

If the IAS 39 and IFRS 9 requirements are compared without staging rule – when all the exposures remain in stage 1 -, then the IAS 39's values lag behind the IFRS 9 ones. As depicted in Figure 1, the impairment rate – impairment divided by exposure – under IAS 39 starts to increase later at the beginning of the recession and starts to decrease later at the end of the recession compared to IFRS 9. At the beginning it is problematic, because the loan loss provision appears later in the

profit and loss statement, and maybe it is resulting that the lending activity is not moderated in time. This characteristic is illustrated with the higher blue line (IAS 39) compared to the purple line (IFRS 9 all exposures in stage 1) in period 11. At the end of recession, there might be a reverse effect to the lending activity, because higher provision values appear in the profit and loss statement reducing the bank's willingness to offer loans.

The effect of the increase in amount could be revealed, if the red line (IFRS 9) is compared to the purple line (IFRS 9 all exposures in stage 1). The variance is caused by the staging criteria.
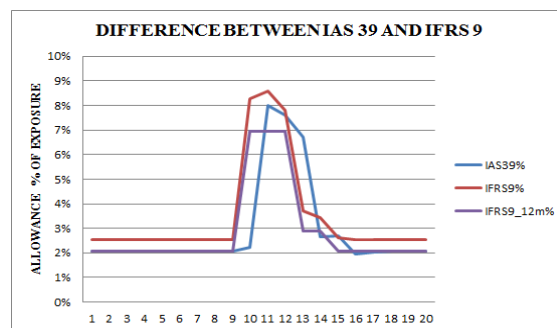
Figure 1 Impairment in IAS 39 and IFRS 9

After comparing the results of IAS 39 and IFRS 9 impairment calculations in different economic circumstances, it is worth to examine their reactions to unexpected macroeconomic changes.

To calculate it, I will run the model with a baseline and a stress scenario of macroeconomic factor detailed in Table 2. Because of the fact that the IAS 39 impairment includes only the incurred losses, such scenarios cause no difference in expected and actual provision values. On the other hand, stress scenario has effect to the IFRS 9 impairment because of the forward looking characteristic of the new standard. Indeed, it is effective only to the deals which are in stage 2 (rating B), where lifetime expected credit loss is calculated. It is illustrated with Figure 2, where red line shows the under-informed and orange line shows the well-informed case regarding the upcoming shock. Orange line is higher in its allowance in period 7, 8 and 9, because in well-informed case the higher lifetime provision of the unexpected shock has been already recognized. It is clear, that the unexpected shock undermines the timeliness effect of the IFRS 9 impairment values.
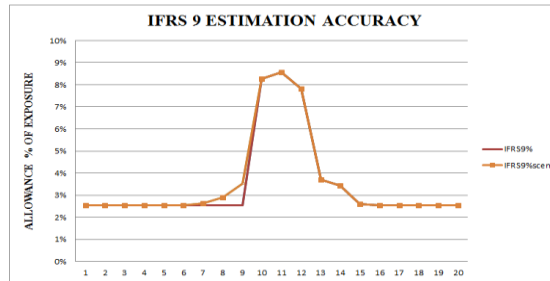
Figure 2 Estimation accuracy

5 Countercyclical buffer under Basel III

The countercyclical buffer is one of the new systematic buffers introduced in Basel III capital regulation. The prescription of that additional capital buffer is in the discretion of local authorities and should be between 0% and 2.5% of the risk weighted asset (Bui et al. 2017). This buffer should be covered with CET1 element of available financial resources.
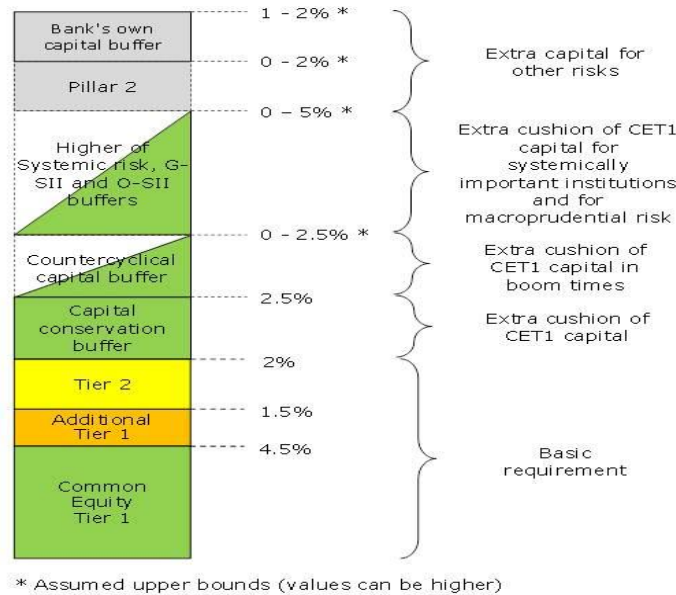
Picture 2 Capital structure in Basel III

Percentage of the buffer is strictly linked to the macroeconomic cycle. In recession it is close to 0% and in boom it should be 2.5% or near to that rate. Linkage to the

macroeconomic cycle means that the buffer is determined based on the credit-to-GDP ratio's deviation from its long-term trend (Geršl et al. 2015). This is in connection with the forward-looking characteristic of IFRS 9 standard as well, and this could be the starting point of further analysis.

For the current analysis I am simplifying the calculation of the buffer to the macroeconomic indicator, instead of credit-to-GDP ratio.

6 Extension of the model with capital buffer

To investigate the combined effect of countercyclical buffer and IFRS 9 impairment method, the previously used model has to be extended with capital calculation.
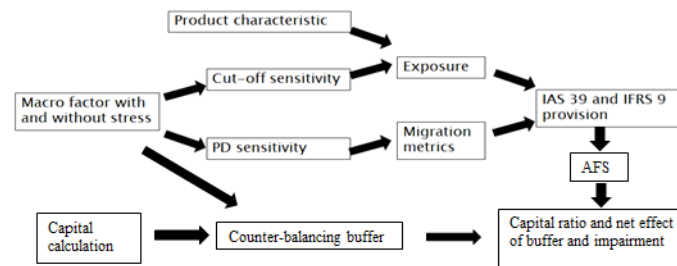
Picture 3 Effects in the extended model

According to that, I will calculate the capital requirement based on the internal rating model (IRB). For the calculation, I will use the unconditional PD, LGD parameters and portfolio exposure. After that, the available financial resources (AFS) and the countercyclical capacity can be determined. The value of available financial resources is calculated as a sum of the AFS of the previous period and expected shortfall. Expected shortfall is the maximum of zero and impairment amount minus expected loss of capital calculation. Countercyclical buffer is simply a discrete function of macro variable. So for example, if normal distribution value of macro variable is between 0 and 0.25, then capital buffer is 0; if between 0.25 and 0.5, then capital buffer is 1 etc. Finally, I calculate the available financial resources equivalent effect of countercyclical buffer and impairment amount. The last one is indeed the expected shortfall itself.

7 Final results

After the calculation with the extended model, the conclusion is that in recession the total effect of these prudential and accounting regulation changes are ceteris paribus anti-cyclical. As it is depicted on Figure 3, if there are worsening macro conditions (red line), then the equivalent of additional effect to the available financial resources value (blue line) will be lower. At the end of the recession, the increase of this additional effect is lagging behind the macroeconomic conditions.
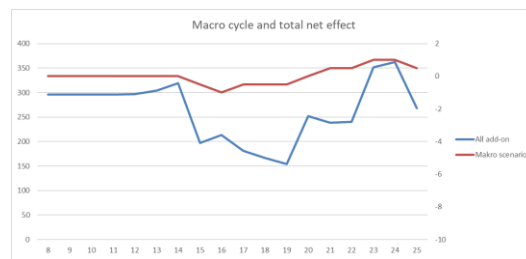
Figure 3 Total effect of net changes in cycle

Digging into the details, it is to be recognized that the countercyclical buffer compensates the increasing impairment amount. The impairment amount is increasing during the recession due to expected shortfall. This is in line with the true and fair presentation of the situation. On the other hand, the countercyclical buffer could compensate the cyclical effect caused by the accounting regulation.
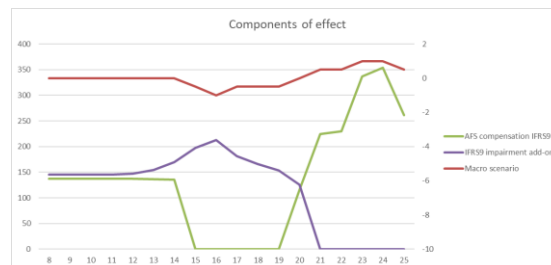
Figure 4 Components of effect

Conclusions

This paper has provided, on one hand, an analysis between the impairment requirements of the old IAS 39 and the new IFRS 9 standards, and, on the other hand, an examination of combined effect of the IFRS 9 impairment amount and countercyclical buffer. At the previous case, the focus was on the two main dimensions of impairment recognition, namely time and amount. I set up one hypothesis for each of the dimensions. I got the result that in my examination the hypotheses are true, so IFRS 9 recognises loan loss provision earlier and with higher amount than IAS 39. It is also shown that the timeliness of the provision is

demolished, if there is an unexpected shock or uncertainty in the economic circumstances. Finally, a typical case of connection between accounting and prudential regulation has been shown, where negative prudential effect of accounting rule (impairment recognition) is compensated by prudential regulation (countercyclical capital buffer).

It is clear that further research is necessary to highlight the detailed, combined effect of the IFRS 9's impairment method and the countercyclical capital buffer, and in a wider scope the interconnection between accounting and prudential regulation, and their effects to the financial sector and to the economy. Some of the issues have already been discussed in (Wezel et al. 2012, De Lis et al 2013), where dynamic provisioning is analysed as an expected credit loss based method, or in (Gruenberger 2012), where capital requirement was incorporated as well.

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Women Motivations Applying for Science, Technology, Engineering and Mathematics Education and Workplaces in Hungary

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Abstract: Women are significantly underrepresented in the STEM (science, technology, engineering and mathematics) fields in Hungary in higher education and, as follows, in the related workplaces. The aim of the research described herein was to explore the sources of motivation of the women who choose to pursue STEM-related higher education. A further aim was to investigate their employment history and examine their opportunities on the labor market. This analysis of the conditions of women's career choices helps understand the reasons for the low share of women in the related subjects and highlights the critical factors behind their commitment to STEM. In-depth interviews were conducted with women who have studied and may work in the related fields. Narrative analysis was used to interpret the results and provide insight into the factors underlying and working situations of the STEM-related decisions of women. Determinant factors included positive impressions of the field in women's lives, such as childhood experiences, and emotionally engaging work experience. The findings suggest that STEM-related issues should be embedded favorably into children's education. State support for STEM-related higher education also has an impact on commitment in this field. Employment-related difficulties which are liable to occur are very similar to those with other fresh graduate students, and include a lack of vision, long-term work experience, appropriate English-language skills, and understanding the content of job advertisements and their requirements.

Keywords: STEM, higher education, labor market, women studies

1 Introduction

Women are underrepresented in the STEM- (Science, Technology, Engineering and Mathematics) related fields in the EU, including in Hungary. Increasing the share of women in STEM jobs would create notable benefits, especially in terms of women's employment and the related economic growth which is facilitated by enhanced productivity (George et al. 2001, Xie et al. 2015, de Sanfeliu et al. 2016). Such a target is thus also shared by the European Union.

In this paper we highlight the different motivations of women that influence their educational and work choices. A further, related research question was also addressed: why do women choose STEM-related professions? The job-searching circumstances and the situation of women in the workplace are also explored. Regarding the main research question (why are women motivated to choose a STEM-related field of education), a model is constructed which enables deeper understanding of the results.

2 Women in STEM-related education

STEM fields are components of the foundation of scientific, technological and economic growth, and consequently have a determining impact on the path of future development. The greater the representation of a social stratum in these fields, the larger its recognition and share of the related wealth compared to less well represented social groups. The proportion of women in STEM fields has been low in Europe, and only in recent decades have changes occurred. International experience (see Friedmann, 2018) shows that whether due to a shortage of workforce or better understanding of the need to dismantle the invisible social barriers, the engagement of women in STEM fields has increased, and the number of women in related fields of education and workforce is proving women's abilities and confuting traditional stereotypes about women.

In Hungary there are more women in higher education than men, which may be due to the difference in their socialization, learning methods, and personal qualities. Table 1. shows that higher education is characterized by severe horizontal segregation: the majority of fields are dominated by either female or male students. In spite of the larger proportion of women in higher education, they are in a minority in STEM fields, particularly in academic IT and engineering programs which are a particularly good path to careers with a high salary. Friedmann (2018) assumes that wages and the ability to balance job and family are the most important factors that foster women's participation in STEM-related workplaces. The proportion of women and men is nonetheless quite balanced in the fields of science more generally.

Table 1. Proportion of female/male students in bachelors- and masters-level higher education by subject in Hungary (school year 2017/2018)

	Share of female students	Share of male students	Share of students as percentage in all sciences
Education	79,5%	20,5%	11,2%
Arts	62,4%	37,6%	2,7%
Humanities	63,7%	36,3%	5,8%
Social sciences	63,4%	36,6%	8,3%
Business and management	56,4%	43,6%	16,4%
Law	61,2%	38,8%	4,8%
Sciences	49,6%	50,4%	3,1%
IT	14,6%	85,4%	7,5%
Engineering	24,2%	75,8%	15,8%
Agronomy and animal health	49,1%	50,9%	3,7%
Health and social sector	67,4%	32,6%	11,7%
Services	54,0%	46,0%	6,0%
Not classified according to training area	53,2%	46,8%	3,1%
Total	52,8%	47,2%	100,0%

Note: STEM fields are highlighted in blue.

Source: Hungarian Statistical Office (2018). The spreadsheet was compiled by HSO following a personal request.

The share of men in IT and engineering is 5.8 (3.1) times higher than that of women. Even though these figures reflect a considerable degree of segregation, the gap has slightly diminished since 2008 when the related figures were 6.6 and 4.3. The small proportion of female students in STEM fields has been defined as a problem in many societies and is linked to stereotypes among teachers, students and other members of society and to the lack of self-esteem of girls (Szekeres et al., 2012).

STEM skills are associated with knowledge-driven growth and productivity gains in high-tech sectors, thus they are critical to boosting jobs and economic growth. Employment in STEM occupations in the EU is estimated to increase by 12.1 % by 2025, much higher than the increase expected in other occupations (3.8%) (EC, 2015).

Beblavy et al. (2013) conducted research in five European countries, including Hungary, and found that both females and males view entry into STEM fields as having a high initial cost, but that only males tend to obtain significant returns

after graduation. The authors claim that this fact might explain why women show less interest in STEM fields, and suggest that an important step towards increasing female interest in STEM fields might be to examine the reasons for smaller post-graduation payback. Related to this finding, a European study concluded that many students do not bear in mind the fact that STEM fields of study can lead to jobs that deal with a range of global challenges, including food security, water resources and environmental protection, which are essential to sustainable development. The research claims that more focus on promoting STEM through campaigns which mention this factor could attract more women to STEM careers because women tend to be more value-driven than men in their choice of studies, thus tend to prefer professions which are perceived to create value for society (EC, 2015).

Although numerous measures have been taken to redress the imbalance between men and women both at the EU level and in Member States, the participation rates of women in STEM fields have not increased considerably. Experiences so far have shown that successful initiatives are comprised of a number of measures such as networking, enhancing the visibility of women experts, promoting the achievements of successful women in research, and offering women career support.

3 Research Method and Aim

The aim of the in-depth interviews was to explore the preferences and the difficulties of women who have graduated from STEM-related fields in order to better understanding their situation, thereby contributing to the development of a tool-kit that creates better employment opportunities for women. The main target of the study was thus to obtain information which will assist in the creation of tools and educational methods that can sustain women's employment and integration into the labor market in the field of informatics and technical sciences.

In our qualitative, exploratory study we interviewed women in two waves in 2018. During the first stage, a phone-based, semi-structured in-depth interview was conducted followed by a further eight online, structured interviews. After this, some novel issues were identified which supported the second stage of research. This involved interviewing a further three women with a STEM background. In total, the choices and experiences of twelve respondents were explored.

Initially, face-to-face inquiries seemed to be the most appropriate method for the research because sensitive issues can arise in connection with this topic. We also believed that this approach would enable us to more accurately explore the attitudes and motivations behind decision making. However, interviewees were often not personally available.

Open interview questions were sent to respondents via e-mail. The importance of the first semi-structured interview was that we obtained experience from the pilot interview that could be used to refine the structure of the guide and the questions.

According to Malhotra (2010), interviews are appropriate for use when sensitive topics and questions are involved. Individual interviews provide respondents with the opportunity to answer questions but also to avoid the discussion of sensitive issues in a group setting.

At the beginning of the online interviews respondents were reassured about the anonymity of the process and their right to opt out of answering overly sensitive questions. They were also told that there were no "wrong answers" in order to encourage them to express themselves freely. The research was open, because we informed participants about the aims of the study.

Interviews were analyzed using content analysis, involving the use of narratives to depict the situation and to report interviewees' points of view. A model was built to draw attention to the main factors which determine women's choices.

3.1   Data

In order to meet research targets, the sample members were recruited according to two criteria: respondents had to be women with STEM-related educational experience. The sample is illustrated in Table 1. Most respondents were young adults (25-30 years old), thus part of Generation Y. Three interviewees belonged to Generation X, and were thus born before the widespread use of the internet. The Y generation is characterized by having less personal contact because they rely on internet-mediated relationships and use social media platforms and related devices (Hidvegi and Kelemen-Erdos, 2016, Kolnhofer-Derecskei and Reicher, 2016). The educational qualifications of the sample ranged from bachelor degrees to PhDs. Most of them had changed their field of interest compared to their original STEM qualification.

Interviewees were predominantly technical managers, but other experts were also represented in the sample: a light industry engineer, an environmental manager, an electronic engineer, a mechanical and safety engineer, a physicist and a clinical chemist. Two interviewees also had other degrees (one as a sports trainer, and the other an electronic engineer). The respondents had mainly earned their degrees from full-time courses, although two of them had attended correspondence courses; further, one interviewee had studied at an evening course as well as a full-time course.

All interviewees had working experience and most of them had a job at the time of the interview, although one respondent was at home on maternity leave, and another was unemployed.

Table 2: Sample description

	Year of birth	Faculty	Educational level	Type of Education	Profession
I1	1993	Technical manager	BSc, graduate	Full-time	Global customer full sales specialist
I2	1967	Light industry engineer	BSc, graduate	Correspondent	Account manager
I3	1989	IT engineer	BSc, graduate	Full-time + evening course	Software tester
I4	1989	Environmental engineer	BSc, graduate	Correspondent	Receptionist
I5	1990	Technical manager business development	MSc, graduate	Full-time	Financial controller
I6	1992	Technical manager	BSc, graduated	Full-time	Costume designer assistant
I7	1993	Electronic engineer	BSc graduate	Full-time	Production optimizer engineer
I8	1992	Technical manager	BSc, graduated	Full-time	Project manager
I9	1988	Technical engineer	BSc, graduated	Full-time	Marketing and selling
I10	1988	Mechanical and safety engineer	MSc, graduated	Full-time	Tool designer; automation engineer
I11	1978	Physicist	PhD	Full-time	Post-doctoral researcher
I12	1982	Clinical chemist	PhD	Full-time	Assistant lecturer

Source: Authors' construction

4 Results

First, the motivation of women for STEM education is explored. After this, job searching circumstances and methods are highlighted, emphasizing the problems which STEM job-seekers encounter. Finally, the situation of women in the workplace is described.

4.1   Motivation for Women's STEM education

The types of motivation for women's choice of STEM education can be classified into two groups (Figure 1). Some women are dedicated to STEM-related professions, while others were "forced" to be STEM students; in the latter case, financial issues played a prominent role.

Motivation for STEM education	
Interviewees' own choice	"Forced" choice
Family tradition	State-funded degrees
Childhood experience	
Emotionally involved	
Previous work expertise	
Working or would like to work in STEM field	Switching consciously
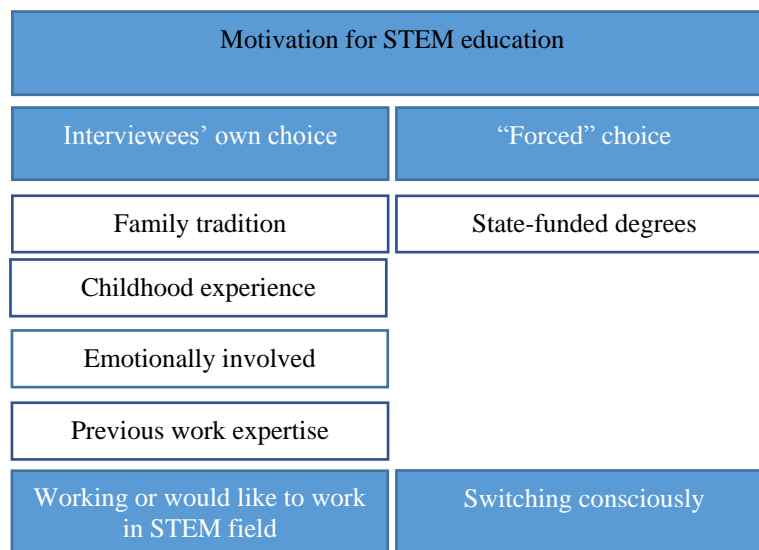
Figure 1: Model of Women's Motivation for Engagement in STEM
Source: Authors' construction based on interviews

Six interviewees stated that they had been really emotionally involved in STEM since their childhood because they liked the related subjects, such as mathematics, physics, chemistry, biology and informatics: *"I have been engaged with computer science since I was 11 years old and interested in it."* (I3); *"I am a kind of study-loving student who likes to go to classes, be responsible for tasks, and participate in industrial site visits. I am active in the lab. I love to solve technological problems with instruments."* (I10*); "I have always been interested in technical sciences and, before applying for a degree, I looked into the curriculum and I found that most of the subjects (biology, chemistry, and physics) used to be my favorites in primary school."* (I4); *"Even in elementary school and later in grammar school it was easy with chemistry and biology to get good results, so it was obvious for me to choose this degree program."* (I12); *"I was always involved in a technical profession, and my salary is also good as an engineer."* (I7); Others had experienced the enthusiasm of family members about technical matters: *"My mother was a 'do everything yourself' type."* (I6). Another respondent applied for a degree in a STEM field because of her previous work expertise: *"I worked in the*

printing industry for several years…After earning my degree, I continued to work for the same company." (I2).

Two of the interviewees did not want to choose a degree from the STEM field originally but they did so because of the Hungarian educational system (in the case of degrees in subjects such as economics, places are self-financing or candidates should have very high admission scores, but in the case of STEM subjects almost the minimum level of points is enough for being accepted on a state-funded course).

One interviewee who had experience with STEM in the family reported that *"The university was very difficult…I would choose another type of education which suited me better if I had the possibility now."* (I11).

There are also notable differences concerning the respondents' evaluations of the proportion of women in STEM fields. Some of them do not notice many differences related to sex, while others have another point of view: *"I do not know anything about female engineers, because I didn't see one either as a trainee, or now."* (I7); *"We are too few."* (I10).

4.2   Job-Searching Circumstances

Job-searching relies on informal and formal sources. Among the younger respondents, the most frequently used methods of job-seeking are job fairs, acquaintances, and social media such as LinkedIn and other job advertising portals. Older respondents reported using noticeboards at universities and personal relationships. Personal contacts can significantly contribute to success with obtaining positions (e.g. recommendations of a teammate or a lecturer, or even a relationship based on an interaction that occurred during the writing of a thesis, as the interviewees noted). Another important route is taking part in company trainee programs, after which respondents continued working at the same places.

Respondents mentioned the very diverse but specifically gendered issues they encountered while job-seeking: *"I have the same opportunities at the workplace as men."* (I1). I6 mentioned that she felt that men are preferred for jobs in technical engineering: *"No job placement is possible (for a woman)."* (I5). *"…characterized by sexism … Girls are not encouraged in primary school to be open to these (STEM) studies. So there are only a few women who apply for such university degrees, graduate from them, and stay in the field"* (I10). I9 noted the widespread perception that: *"The place of women is at home […] Men are always preferred."*.

Most respondents had not any serious problems with finding a job, although this took them a range of time – from one day to a few weeks, two months, and as much as half a year.

The main obstacles (Figure 2.) were a lack of long-term work experience as a career starter (I3, I6) or a lack of knowledge of English (I1); however, in the latter case the interviewee had the chance to improve her skills after admission to the workplace. Furthermore, I7 stressed the importance of language knowledge (she was looking for a job in Germany where knowledge of German was required). A further difficulty was that *"I could not decide what I wanted to do."* (I5).

Other problems were related to job-seeking more generally, including:

- understanding job advertisements – a lack of practical knowledge about terminology and understanding which skills and capabilities were required;

- the fact that employers do not understand the needs of the new generation;

- realizing that a jobseeker will not be called in for a job interview if she does not have the required certificates, even though she has the appropriate competences.

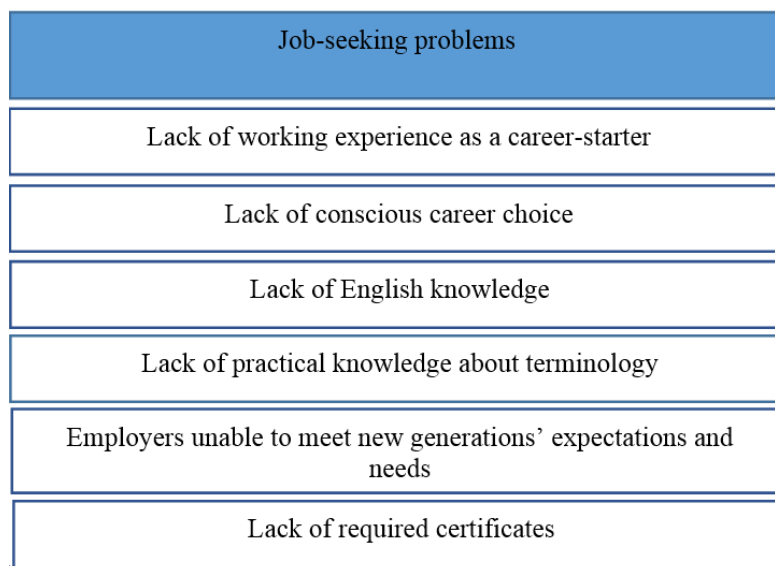| Job-seeking problems |
|---|
| Lack of working experience as a career-starter |
| Lack of conscious career choice |
| Lack of English knowledge |
| Lack of practical knowledge about terminology |
| Employers unable to meet new generations' expectations and needs |
| Lack of required certificates |

Figure 2: Problems Encountered by STEM Job-seekers
Source: Authors' construction based on interviews

4.3   The Situation of Women in STEM Workplaces

More respondents are satisfied with their jobs, like their professions, and did not mention any problems related to their workplaces. *"I would not call them problems but rather challenges; in every situation you have to find the right*

solution for your work." (I2); *"There is such a lack of workforce that I have very good opportunities (and will also in the future)."* (I7).

Women may face difficulties in the case of demands for hard physical work (e.g. moving products), but an interviewee states that (I6) *"Personally, I never felt the disadvantage of being a woman. This incorporates the fact that I have some great bosses [...] Overload affects all of us. It is difficult to put a researcher's life into the frame [....] Flexible working hours means that if an experiment lasts until 10 pm, we will be in the lab or if there is a deadline, we'll work until dawn after the children are put to bed. This often generates frustration and creates sleep deprivation."* (I12). Moreover *"...being undervalued, aggression, humiliation, and lack of communication..."* (I6) and stress (I5) can arise. I9 reported that *"Internal conflict and a lack of team spirit are the main problems."* at her workplace. However, I6 explained that she had faced more serious problems in the film industry, such as are represented by the '#metoo' campaign in Hollywood which involves the struggle for the equality of women actors. A further problem is that *"A masculine attitude is more appreciated [...] most disadvantages lead back to feminine characteristics."* (I11). Inequality occurs in the form of unequal salaries in the same field. A more serious and general problem is that salaries sometimes do not provide enough to live on.

Among the "dream jobs" of respondents are chief financial officer, entrepreneur and NASA researcher, but one interviewee claimed that she was satisfied, saying *"The dream job for me is the one I have now."* (I2), while other respondents would like to have the same job as now with better conditions: *"Project manager at my current job."* (I7); *"Software tester (or test manager) with greater responsibility and a higher salary."* (I10); *"I always wanted to start an enterprise. I like start-ups."* (I9). *"I would like a job that is exciting, meets my interest, and where I can continually improve my knowledge. It should give me the opportunity to travel a lot, and I should get appreciation for my work, and it should involve a harmonious working environment where I can also appreciate my colleagues and my employees."* (I6). I4 likes her job although she had wanted to establish herself in a STEM job but could not. In the future she would prefer a STEM job with flexi-time work.

"I like my work, but I feel 'unsocialized'... People have low emotional intelligence, and a low threshold for stimuli and motivation [...] I would like to be an entrepreneur; I can't imagine anything else in the long term." (I10). Others prefer to work in a team: *"Where you can work in a well-organized team, coordinating the strengths of different people in the community for the sake of success."* (I11).

All respondents reported that they could return to their workplace if they had a baby. *"Everyone at my workplace can work one day a week at home, and with permission even two days. A colleague (who has children) works twice a week at*

home, and sometimes starts early and goes home earlier […] so, this will also be the right place for me with a baby." (I1).

Conclusion

The research method we have employed is inappropriate for drawing overall conclusions but the results highlight the main problems which women face in STEM fields, and provide information that helps improve their opportunity to be integrated into the labor market.

The decision to opt for an education and work in the field of STEM appears to be deeply rooted in individual socialization experiences. Positive childhood experiences can contribute to the creation of positive attitudes towards technical and information sciences, and may result in engagement with STEM.

Women with experience in STEM claim that they face problems similar to those of men. However, many problems are related to conflict management and teamwork, and could be improved by training.

In order to better integrate women into the field of STEM, it is necessary to overcome both stereotypes and prejudices. However, if knowledge obtained in the STEM field is coupled with the wider personal competencies that facilitate individual careers, STEM may represent a promising opportunity to integrate women and thereby bridge differences.

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An examination of the efficiency of logistics processes at STI Hungary Kft

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Abstract: Logistic processes are integral parts of commercial processes. Logistics, being one of today's most dynamically developing business sectors, brings new challenges and opportunities to us. To aim for efficiency in logistical processes and their management is therefore essential, and the limit is the sky. Thanks to the continuous technological innovations and the ability to change, we can realize a great deal of performance improvement which determines the proper functioning of the entire corporate system. Recognizing this possibility, the Germany-based S.T.I. Hungary Kft. asked for our assistance to look at the company's processes as an external viewer, so they can change their processes and the efficiency of their systems with the help of our knowledge and suggestions.We detail this research and some of its results in our study, showing that with some simple organizational changes and standardized performance indicators, not only the image of the company will be more realistic and more accurate, but we can realize profit as well.

keywords: logistics, efficiency improvement, organization development, BPR

1 Introduction

Most of our business departments in our company rely on the efficiency of logistical processes. Managing these processes require a huge amount of work time due to the value it can add to products or services. One of the main goals of companies is the increasing of effectiveness in order to offer high quality products and services and reducing production costs and time. [7] Improving business processes can lead to more efficient working and higher profit. Customer, worker and business owner satisfaction increase can be achieved this way as well. Despite these opportunities, there are only few company leaders who decide to ask for external help to reorganize their workflow. This is can relate both to workers and leaders getting used to their daily routine, which means they could hardly realize additional potentials or change their methodology. The study highlights on the significance of business improvement by detailing our work with a logistical company suffering form different issues. Our advices and the work of their experts may lead the company to realizing bigger profit, working more effective and improving their key performance indicators.

The examination starts with the theoretical approach of improving efficiency and then the study details how it could help STI Hungary in practice. Combining our knowledge and the expertise of STI workers we were able to achieve the goals we set up at the beginning. During months of work we discovered every small details inside the company and issues need to be get over. We describe this work and the results in our study below.

2 Logistics

Logistic services are not related to modern business, logitic processes were very imporant in ancient times. Improving agriculture and the industrial revolution requried goods to reach the manufacturers as soon as possible [16] These demands and fast development of technology helped people using better and better tools in order to work more efficient and be more profitable by making transporting easier. Altough this can only be achieved by properly working organizations.

According to the Swiss Federal Institute of Economics Research (BWI), corporate logistics is a set of cross-border tasks that rely on corporate purpose and the resulting measures to ensure optimum material, information and value flow in the company's transformation process. [5] Lajos Kormendi described "the shortest and most frustrating" definition as the science of supply. [8] Donald Waters examines a process within a given organization. According to him, the range of activities and companies that move materials between these stations together form a supply chain. [13] Based on the experience gained in the above definitions and our study,

our logistics in the business sphere is as follows: Logistics is the branch of business processes that allows the flow of information and goods from their starting point to end-use, with the smallest effort to maximize the company's results and customer satisfaction. Supply chain management is a comprehensive management of these processes.

In order to function properly, we can find many models. For example, the well-known 5M model or the 7M innovations are in line with the right consistency, with the release of the right product delivery, or the later 9M, which also pays attention to the economy and the information. [2] Of course, the most important aim is making profit. It also depends on the efficiency of their operation. The success of a successful company is strategic thinking, customer focus, efficiency gain, innovation, and ability to change. [11]

In order to function properly, we can find many models. For example, the well-known 5M model or the 7M innovations are in line with the right consistency, with the release of the right product delivery, or the later 9M, which also looks at the economy and the information. [2] Logistics companies are of course one of the most important goals of profit making. It also depends on the efficiency of their operation. The success of a successful company is strategic thinking, customer focus, efficiency gain, innovation, and ability to change. [11]

The financial performance of a company is evaluated, monitored and possibly improved by leaders of many areas. For example, current and potential owners, company managers, so management, current and potential creditors of the company, and often the company's rivals [3]

Unfortunately, in case of Hungarian companies, the support of operative decisions has to be put in the background, and corporate IT professionals do not use the IT system. Likewise, no such device is used for performance measurement. [14] To help re-think existing processes and rationalize corporate processes, companies do not take advantage of IT opportunities. [9] Modern management is not only responsible for competition calls today, but also needs to be flexible while maximizing profits. [15]

According to Huq, the main cause of BPR errors is a fragmented approach to changing corporate processes. Managing corporate processes in a unit and context helps to create optimal regulation and alignment with the IT system. [6] The activities of BPR are not tasks or activities, but rather the results. This also determines the scope of its application. [4]

The company's time spent on actual production ranges from 5 to 25%. So, a significant part of the working time is taken up by complementary activities such as information flow and processing, control tasks, material handling, or transport, storage. [12] In case of a logistics company where these activities are mostly the core activity, we might think that this ratio is much more efficient. However, experience shows that this ratio can not be changed regardless of the company's

profile. That is why, for the attendance of customers as much as possible and for the satisfaction of management, it has a role of reviewing and streamlining the processes for a logistics company. [11] As the competition of market is high enough in this area, the price competition does not spare the logistics provider either. Improving efficiency as a profit-enhancing factor also plays an important role in these companies. So the factors of company efficiency are logistics, quality assurance, productivity and competitiveness. [1]

The management of the company should identify the available data to help achieve preliminary results and make comparisons with earlier periods. Based on these analyzes, it is worth developing an action plan and a schedule for rationalizing corporate operations. [5]

Of course, after the transformation, it is necessary to compare the measured results with the previous values so that we can conduct further analyzes and see how the company has reached the target. [10]

2.1 STI Freight Management

The group of STI Freight Management is the member of the HAVI Logistics Group. For the coordination of ever-increasing international transport tasks between European suppliers and the HAVI distribution centers, today's STI company was founded in 1983, whose core business is the so-called "Pre-Freight" was the organization of shipping tasks between suppliers and logistics warehouses, based on the McDonald's quality assurance and food safety standards and principles. STI offices are basically based on HAVI infrastructure in all countries, mostly in an office building with shared financial and HR functions, that is, they work in close co-operation. In 2010, by creating the STI Freight Management group and integrating the various STI companies into the group of companies, they have made the company more efficient, professional and have become an important member of the European market in the international food logistics market. but only through European road traffic, but also through its headquarters in Germany, it performs significant overseas container and air freight forwarding and customs clearance tasks. Over the past five years, the company has started to develop significantly in new business areas alongside serving classic food industry partners. The German company carries out the European port service of the world's two largest tourist boat companies in strategic partnerships, with the specialty of meeting the virtually minute needs of transport requirements tailored to the schedules of the ships, and the Scandinavian and Hungarian organizations introduced a new branch of pharmaceutical logistics, international drug delivery and local clinical distribution services. In addition, all STI companies operate the so-called collection services to their region for their smaller transport volumes, so the network can provide full European coverage of up to 1-2 palletized volumes for controlled transport of air in any respect. The strategy of

the STI is to provide unique quality of service at an affordable price for its existing and future strategic partners through more efficient utilization of the European network's synergies and stringent quality standards. STI Freight Management currently operates 12 offices in 9 European countries with more than 220 employees, delivering nearly 285,000 freight per year. The Hungarian company, STI Hungary Kft. was established in 2005 and acts as an independent legal entity in the same way as the other STI companies and is directly under the control of STI Freight Management, so the headquarters of the group in Duisburg. In 2016, 13.500 completed freight missions, nearly 3.5 billion forints revenue was achieved in Hungary.

3 Research

The basic problem was, which we started our research, that the Hungarian office at the Duisburg center was not efficient enough. In order to solve this problem, we have been conducting organizational screening for several weeks, with a complete picture of the company's internal processes, the responsibilities of each department, its communication and organizational network. We learned the neuralgic points of the processes. In order to meet all of the possible situations of all staff members of each department, we have taken a condition survey at different times at different locations of the company. We fixed what tasks had conducted, how muck time needed and who was involved from the staff. During the in-depth interviews, we were not only interested in the individual free opinion of the staff, but also on the presumed antecedents and possibilities of solving the problem recorded at the given workstation. During the screening process, we could get a complete picture of the company's processes.

3.1   The results of the STI screening

Based on the known states, we can say that we are dealing with a relatively straightforward linear organization in which the tasks are well separated, broken down into organizational units. Based on the in-depth interview we could distinguish the following jobs and task groups:

The chief executive / business development manager is primarily responsible for contacting clients, but he is also responsible for HR tasks and is responsible for arranging meetings. His/Her work time is largely on checking existing customers and searching for potential new customers. His executive duties are supplemented by the Operational Leader / Quality Assurance Officer. His tasks are mainly carriers' examination of the quality assurance section, and now he/she oversees and manages the operation. Both leaders have a very fragmented role, many of them are part of the task. Their daily work is very diverse. The HR tasks and

organization of corporate meetings are common tasks. This ongoing joint work also requires that they have a common office, since they have to provide information for almost every day for smooth work.
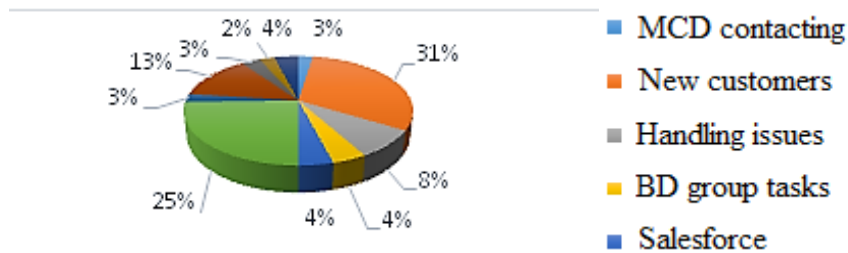
Figure 1 Time-proportional distribution of management tasks

61% of *billing* jobs are filled out by partners' outgoing casual and collecting bills, but he deals with archiving incoming bills, dealing with related claims and posting orders.

The *controller's* tasks are primarily, almost 40% of the annual and monthly reports are made by auditing, reports. At the same time, his job is to prepare business forecasts and audit duties, as well as the management of claims.

Freight managers, who account for a significant portion of the company's employees, represent half of them and perform the main business of the company, also perform a multitude of tasks. A quarter of their work is recordin into the IT system. 18% of their tasks are capacity searching on the market. In addition, their tasks include receiving all incoming orders, planning freights, issuing these to the company carrying out the carriage, and performing post-shipment verification procedures.

Paletta admin is a special position at the company. A freight forwarder who controls the movement of the pallet or the administrative work of the freight organizers. Its task is to check the accounts for pallets, in which you can notify customers about the possible palettes. Detects, organizes, and retrieves possible returns.

The *administration assistant* is responsible for receiving invoices, freeway assignments, support for operations and other archiving tasks. Fixing invoices and freight orders significantly contributes to the work of both the billing department and the freight organizer site.

STI measures the efficiency of individual offices by 5 different indicators that are sufficient to fully understand the strengths and weaknesses of a particular organization.

- **CostEfficiency**: Shows how much a worker works with regard to profiteering. The calculation is based on the ratio of gross profit and

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admittance. The charge does not include costs beyond the normal operation. These may include, for example, costs of damage, local taxes and financial charges. The Hungarian office is in the midst of this number, since the wage cost of most of the administrative costs is favorable compared to western offices.

Table 1 Cost Efficiency

	Cost efficiency (Teur)
United Kingdom	221,5
Poland	212,6
Hungary	163,0
Spain	144,3
France	139,0
Germany	131,2
Sweden	128,4
Russia	104,0
Italy	77,5
Average	146,8

Source: authors

- **AdminEfficiency**: Shows the number of orders placed on an STI worker. This is the order number / FTE (Full Time Equivalent) ratio. FTE, as it means full-time workforce, can result in fractional values. It appears from the table that the Hungarian office is the last place, far behind the average value.

Table 2 Admin Efficiency

	Admin efficiency (order/capita)
United Kingdom	213,4
France	161,5
Sweden	142,8
Germany	141,5
Spain	140,1
Poland	128,9
Italy	124,2
Russia	89,4
Hungary	78,5
Average	135,59

Source: authors

- **FoodSafety**: Shows how well McDonald's Transport Security Policy has been met. As far as STI is concerned, it is the security measures required during carriage. These include: the choice of appropriate means of

transport and personnel, the delivery and documenting of the appropriate transport temperature during transport and transportation, the compliance of the seal specifications and the possible temperature complaints.

- **DeliveryReliability**: This number shows the proportion of complaints, in proportion to all orders that have been made. This includes, for example, improper behavior of a driver, use of a vehicle with an unauthorized advertising surface.

- **On Time Efficiency**: Shows the timely arrival of orders to suppliers and recipients.

It has become apparent that there are various problems that can be observed in certain indicators and in the organizational unit. Among the index numbers, the efficiency of the company's operations is best characterized by Cost Efficiency and Admin Efficiency. Among them, as mentioned above for Cost Efficiency, the Hungarian office performs above the average value, so during our job we did not need to improve this value. On the other hand, the value of Admin Efficiency is significantly behind the other offices.

The reasons for this may be:

- Few orders are made by freight forwarders.

- The number of full-time employees is high.

- The number of employees and their number of orders is not counted uniformly in the different offices.

The first two reasons were excluded because all employees need extra working time to doing their tasks properly, so the problem may be that the number of orders and employees report differently. Different countries do not count the workforce which is included in the HAVI staff but also STI jobs is done and orders are treated differently within the freight organizer program, unlike Hungary, each address is an "order", while at the Hungarian office there may be more titles than one order. The company has standardized the values in each country, compared to the same month of the same year in order to exclude seasonal factors.

That as a result some countries have moved in a negative direction. Since we did not know that the performance of an office would suddenly deteriorate during the year, we can assume that the distortion of the indicators is due to the changes caused by the unified system.

Due to the due diligence of the organizational units and the in-depth interviews with the staff, the optimum redistribution of the tasks and the slight transformation of the organization took place. Employees' net work time of 8 hours was considered as 100 time units for simplicity, meaning 125 time units represent 1 full day job with 1 hour overtime. Knowing the time needs of each job as

measured by the employees have been obtained, which reorganization / development proposals can save time to the company. To quantify the estimate, we multiplied all of the net time units of the workers concerned by multiplying the savings of working time and the number of workers concerned, resulting in unit time savings.

Figure 2 Feasibility / cost
Source : based on company data the authors

The efficiency of the Executive Director and Operational Manager can be improved if employees' questions do not go directly to them, but appoint a head of admittance who has the right to make decisions in cases where freight forwarders can not make decisions, but do not necessarily require leadership involvement. His task is to take away the tasks related to the day-to-day work of the admin area and prepare for financial decisions from the businessman, the business development leader and the operational leader. This also improves efficiency on the freight organizer side if freight forwarders are more actively utilizing the help of a staff member from a financial point of view. For the purpose, the HAVI outsourced controller was best placed for this purpose, so STI Hungary permanently took over the 2018 From the Executive Director and Operational Leader and Cargo Operator section, we realize 103 units of time savings. However, this means a small, but organizational transformation for the company.

Efficiency can be increased by palette admin, on the one hand, by eliminating unnecessary control processes that arise from the fact that the current billing system is faulty. In practice, this means that documents of non-pallet-exchange transportation are also available to the palette collector. Another problem is fixing the shortage of palette to two places. The palettes are recorded in both the Carlo administration system and in a special Excel file for various filtering and registration reasons, since the Carlo system is not aligned with the program. These problems could be solved by upgrading the account control system and Excel macro fixation. In case of realization, 19 units of time savings can be realized.

Currently, orders received by e-mail are sent by freight forwarders to a colleague of an admin assistant who electronically saves them in the appropriate directory of the flight. The received orders are duplicated. The freight organizer will look for it and then send it to the Azadmin Assistant who archives it, but as long as the freight forwarder finds and sends the order, he could save it at the same time. This process would have a lot of extra time on the side of the freight organization so it would not be enough for the company to realize the assistant's time. In case of realization, 17 units of extra time can be realized, on the part of the freight organizer and 5 units of time on the assistant side. On this basis it can be stated that this change would not be favorable for the company.

In many cases, supplier issues are unreasonable for the controller, there are some questions that would be answered by HAVI's outsourced accountant. The reason for this is that the decision-making powers are not properly clarified. The solution to the problem is to clarify the lawyer's and the duties of the accountants to know the problems that the outsourced workforce may decide on. In case of realization, 4 units of time savings can be realized from the controller part.

Automating dispatching and informational mails would speed up the palette admin's work as they are currently performed separately. This process can be automated by the previously mentioned excel programming, which means significant time savings from the palette admin side. In the case of a palette admin, 10 units of time saves could be realized.

By changing the practice of billing, you can realize up to 9 units of time savings.

Employees in the company belong directly under management in the organizational unit. Appointment of an operation supervisor would be necessary, as the manager of an organization needs to deal with issues of freight organizers. In addition, checking the position of vehicles, consignments and informing the partners can be incorporated into the scope of their duties. Promoting a more experienced freight forwarder would give the new position a chance for internal decision-making so you can find a solution in the right place and time. It also saves time for freight forwarders by carrying out inspection and information tasks. In the event of its realization, a total of 184 units of time savings can be realized from the freight organizer and operational management section.

In addition, significant time savings can be achieved by introducing electronic billboards and delivery notes. As it realized, billing and admin assistants together can save up to 14 units of time.

Carlo is a logistics software used by all employees of the company, which records all tour organization and financial information, so the effectiveness of the program has a huge impact on the work of the employees. The system is often slow due to overload, which takes valuable time away from employees. Speed enhancement is a task out of the organization that is run by the software operator, making it

feasible to be independent of the office. Usually, you can realize 35 units of time savings on each part.

Further improvement can be achieved by recruiting a new freight forwarder, but the company's request was to improve efficiency without increasing staff numbers.

Summary

If all of our proposals are implemented in accordance with the forecast, a new organizational chart is created and a total of 463 units of net work time savings can be realized, which means a 29% efficiency improvement potential for the company.
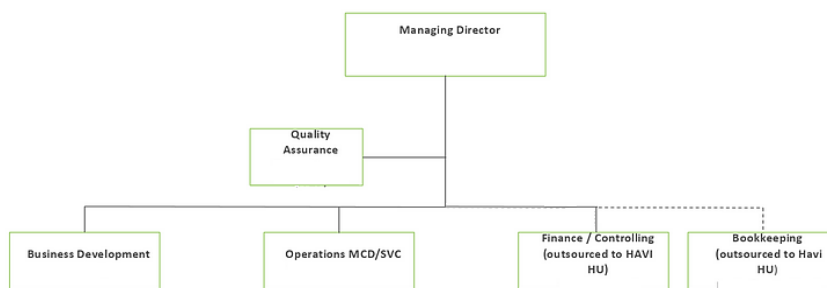
Figure 3 Organizational structure of the company
Source: authors

It should be pointed out, however, that this is only a theoretical value assuming that the proposed modifications are fully estimated. According to the company's leaders, approximately 15% improvement is likely. This result provides two opportunities for the company and the employees. The first option is to introduce a new bonus system, which will keep the average daily plus a working hour and allocate free capacity for new ferights and half of the additional revenue will be allocated to the freight organizers. The second option is to reduce the working time so that all employees of the office can do their daily work without overtime.

Of course, after the changes, further tests will be carried out to check the effectiveness of the new work processes and compare them to the previously measured values. This will allow you to calculate the exact value of the increase in efficiency. The company plans to adopt the proposed changes in several stages, during 2018.

Overall, it can be observed that a work-friendly system can be established in a multicultural environment, with appropriate organizational transformations and process optimization, in which it can be brought in line with the development of the company and the increase of employee satisfaction.

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Is it really difficult to decide? Conflict management with conclusion of a case.

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Abstract: Alternative dispute resolution (out of court dispute resolution; extrajudicial dispute resolution) methods are to support natural persons and legal entities with several levels of conflict management. Reorganisation, resolution, restoration, evaluation, and transformation are present to give methods to the parties. Mediation is an opportunity in the subject of alternative dispute resolution system, as one kind of procedures to solve a conflict. Mediation is based on the voluntary participation of the parties. Mediation is a procedure, in which an intermediary without adjudicatory powers –the mediator- systematically facilitates communication between the parties with the aim of enabling the parties themselves to take responsibility for resolving their dispute. Persons sometimes decide very quickly, in short term, sometimes the opposite: after months, after years there is no decision made for several reasons. The deeper the conflict is, the harder it is to get out of it, but what can be the reason to wait years for a solution even if there were other choices? Fear from the loss, fear from the responsibility or from changes? Through a case-study this paper aims to give a possible answer.

1 Trust in our decisions

Various definitons of conflict is known worldwide and the definitions lived with historical changes, developed with people and with society. The conflict is a conflict between the interests of natural or legal persons. Some of the conflicts are community conflicts, on the basis of common interest (state, local municipalities), some of the conflicts are based on individual interest, some conflict arise in the international level, between states, and we know, if states were in conflict in the history, there were often wars in connection with their conflicts. There are several examples in countries how to manage a conflict and it is based on historical-cultural development of each country. Through the interdependence of nations and cultures, disputes and dispute resolution processes need to account for much more than just the dispute itself [20]. There are several very important consequences of a person's, of a legal entity's or a society's behaviour in connection with decision making and solution finding in the case of emerged conflict. The important aspect

of financial background, of the question how the choice of alternative dispute resolution influences economy through the effects on economic life.

Successful modern societies are based on the willingness to cooperate, supported by GLOBE (www.globeproject.com) research with international comparisons [7].

The aim of this paper is to introduce and stress, that every person, legal entity (state), community has its own and special social-historical-financial development level. This paper wants to give an answer to the question if communication has an important role to reach a contract (one way of resolution) and if trust plays an important role in this procedure of communication (non-violent communication). Trust can support conflict management and is able to give a snapshot of the general state of society, and is capable of influencing person's (people, legal entities, communities, states) compliance with the law.

The GLOBE survey –GLOBE Research Program- covering 62 countries (including Hungary, from European clusters to Eastern Europe with Albania, with Armenia, Greece, Kazakhstan, Poland, Russia and Slovenia), ranked Hungary 61th in the rankings, as last but one, examining the society's willingness to cooperate

Eastern European cluster has a population of 232 million and a gross domestic product (GDP) of U.S.$772 billion. The cluster's distinctive cultural practices are high power distance and high family and group collectivism. The region is facing significant challenges during its period of transition from communist philosophy to market-based economies. The participating managers value a much greater degree of future and performance orientation, but are strongly attached to their cultural heritage of deep family and group cohesion. They are also highly value charismatic and team-oriented leadership [1].

On the basis of these facts, in the field of social cooperation, Hungarian is a self-interest driven, dissolving society that would surely be more successful if its members were to assume responsibility for the consequences of their acts. As responsibility and willingness to cooperate grow, and we learn to make as many common results as possible from a given situation, then wealth will grow healthily, emotionally and economically. The lack of cooperation will cause enormous damage to the economy, but it also has extraordinary potential for development, resulting in a change of social attitude, quantifiable economic results and savings [7]. Fortunately, since the above research, more than ten years have elapsed, and the development of mediation and financial reconciliation in this article has progressed along with the development of the entire alternative dispute resolution area, and the future is also determined by this trend.

Apart from some of the highlighted Hungarian examples, they give an insight into where the alternative dispute resolution is today - alternative dispute resolution can be found in many places in the world. To strive for peaceful conflict management and peaceful resolution of disputes, today we call court mediation,

mediation, conciliation, arbitration, litigation, and arbitration services as an alternative dispute resolution.

However the filed of business mediation can not be clearly separated from other mediation types, business mediation often fuse with them, furthermore research shows that mediation have to viewed as complementary elements of an integrated system and that the key to successfull dispute resolution in international business is conscious and creative design of conflict management process [3].

Mediation is a procedure which may benefit the business. Parties which worked out a consensus are more willing to maintain further relations. Moreover mutual trust is maintained. Research shows that trust is not only very important in business but it can play the most important role e.g. in the field of logistics when the question is about taking/providing services, however price and flexibility do matter as well [2].

After mediation trust may be even bigger than before the dispute as parties are more likely to perceive their business partners as reasonable and responsible people, with whom they can go through conflicts and resolve the problems in a proper manner, without court [22].

Trust does not, of course, play a decisive role not only during the conflict management of legal entities but also in the conflict management of natural persons. Based on trust –this is the fundamentum mediation process can work.

Two conditions of trust are risk and independence. Three phases are building, stability and dissolution [19]. Trust can be conceptualized as an orientation toward society and toward others that has social meaning beyond rational calculations [21]. It is stated, the level of of trust between the trustee and the truster (client) is defined by the sum of credibility, reliability and intimacy divided by the self-orientation. $T=(C+R+I)/S$ Client can be a friend, familiy member, stuent, boss, direct report, or any other person you enter into a trust relationship with [18]. Figure 1. gives a brief formula titled the trust equotation based on the work of Maister [13]. It records that trustwothiness is the summing up of credibility and reliability and intimacy divided by self-orientation.

Figure 1. The Trust Equation

Source: thegetralproject.com

It is important and relevant that the parties involved in the conflict can communicate with each other so that the existing conflict of interest is further aggravated by further diligence, lingering litigation, but, as far as possible, resolving the dispute and settling the dispute with an agreement. This requires cooperation between the parties.

What does make peace possible, what kind of resources are needed for peacebuliding? It is abundantly clear across our globe, both historically and at present, that the expenditures and resources consumed by war far outpace those allocated for building peace. Without adequate resources, explicit preparation, and commitment over time, peace will remain a distant ideal rather than a practical goal. The primary goal with regard to resources is to find ways to support, implement, and sustain the building of an infrastructure for peace over the long term. To achieve this goal we need an expanded understanding of resources. The approach of the question of resources for peace under two broad headings: socioeconomic and sociocultural. The former suggests that resources do, indeed, involve a monetary aspect, but that equally critical is the sociological dimension int he disbursement of funds. The latter suggests that people and their various cultural traditions for building peace are also primary resources [11].

2 Conflict management in numbers

The term „conflict" has no single clear meaning. Much of the confusion has been created by scholars in different disciplines who are interested in studying conflict. Reviews of the conflict literature show a conceptual sympathy for, but little consensual endorsement of, any generally accepted definition of conflict. There is tremendous variance in conflict definitions that include a range of definitions for

specific interests and a variety of general defintions that attempt to be all-inclusive. Conflict can be considered as a breakdown in the standard mechanisms of decision making, so that an individual or group experiences difficulty in selecting an alternative [16].

While mediation is often thought of in the context of personal conflicts or family disputes, business owners realize that mediation services are available to resolve business-related disputes as well. In the hungarian legal regulation there are several ways for persons how to resolve a conflict, how to resolve a dispute, how to continue with familiy members, neighbours, colleauges, business partners. Of course, courts fulfill the task to decide in the complaints of clients, to run the procedures of trials.

Table 1 and Figure 2 displays what is the number of mediators and how many cases are there yearly to solve. From the year of the Act on Mediation has became to effect, from the year 2007, can we observe an increasing will of natural and legal persons to initiate mediation? The number of registered mediators at Ministry of Justice between 2010-2016 were the following:

Table 1. and Figure 2. Registered mediators at Ministry of Justice Hungary 2010-2016

	2010	2011	2012	2013	2014	2015	2016
Registered mediators at Ministry of Justice	1272	1408	1578	1615	993	1041	1168
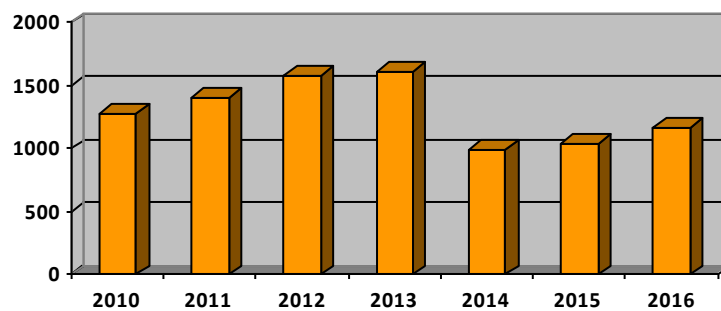
Source: prepared by the author based on the given datas from Ministry of Justice, Hungary 2018

After three years of increasing in number of registered mediators, a relapse can be observed in 2014, which has been followed by again with slow increase in 2015 and 2016. The requirements of further training and continuative education of

mediators included in the legal regulation may influence the issued registered mediators.

The numbers of incoming cases speak about changes in the old statement according to the saying 'It is good to argue'. Perhaps people and decision makers change their minds and make the choice to choose alternative dispute resolution. Between 2010 and 2016, on the basis of data giving of registered mediators Table 2 and Figure 3 show the conformation of mediated cases, separately the cases with a successful agreement at the end and separately the cases without a successful end.

Table 2. and Figure 3. Incoming cases to registered mediators at Ministry of Justice Hungary 2010-2016

	2010	2011	2012	2013	2014	2015	2016
successful (blue)	216	708	370	589	851	864	983
unsuccessful (yellow)	63	203	160	204	260	487	400
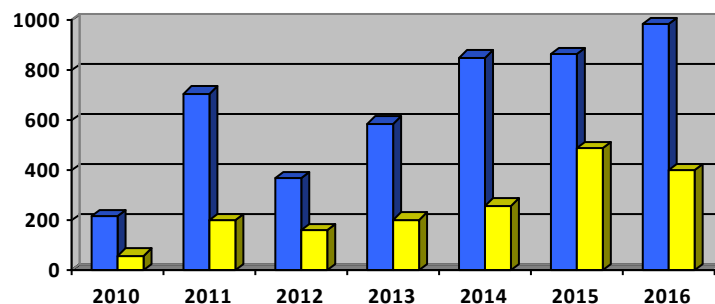
Source: prepared by the author based on the given datas from Ministry of Justice, Hungary 2018

Stated in Table 2, that from the year 2014 there is a stable increasing in both – successful and unsuccessful ended incoming cases. Starting from the figures in the table, it is hoped that the number of people, firms or even communities that are choosing mediation will grow and overwhelm the old saying that it is good to argue. Hopefully this is despite the fact that Figure 3 shows the development of litigation cases in numbers, and these figures show almost stagnation, growth or only a minor decrease in litigation in all areas, except for one group of cases. This group is civil and business non-litigous cases, which data for 2010 decreased by 39% compared to 2009 figures and then decreased by 83% from 2010 in 2011.

The development of civil lawsuits between 1990 and 2016 can be said that as a result of the fall in the number of non-litigous procedures, the burden of the courts has been reduced from the year 2010 as depicted in Figure 4. Based on data about

the cases, trials at hungarian courts provided by the hungarian Central Statistical Office it is clear that, in 2010, the total number of cases, decreased by 24% from 2009 to 2010. It is most affected by the legislative change that a major group of non-affiliated cases, payment orders are mostly made by notaries.
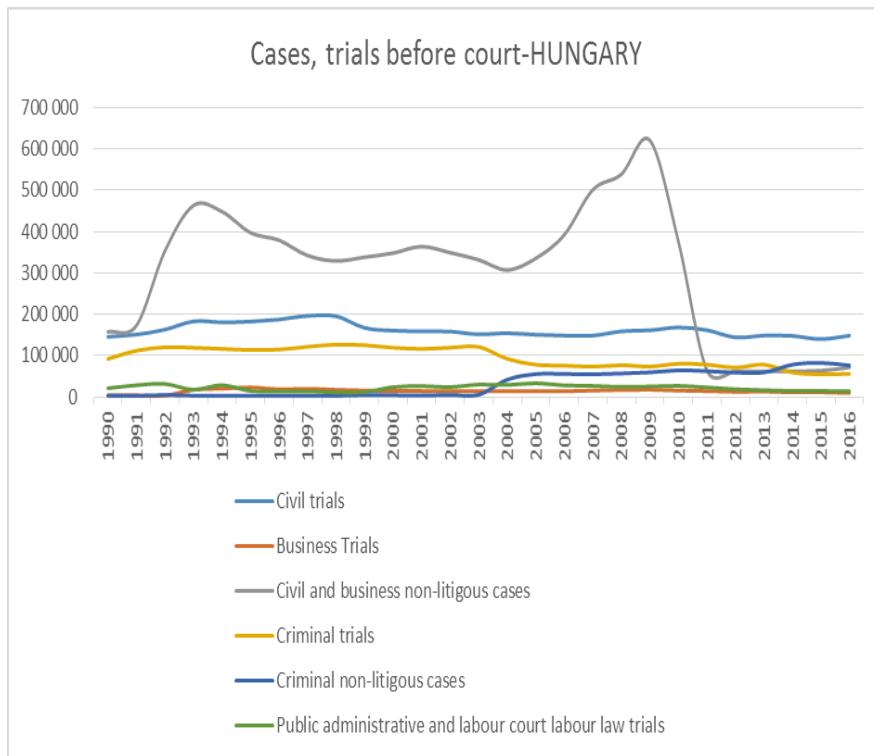
Figure 4. Changing of cases, trials at hungarian courts 1990-2016

Source: Hungarian Central Statistical Office Hungary, www.ksh.hu decreasing number of civil and business non-litigous cases only, civil trials (1), criminal non-litigous cases (2), business trials (3), criminal trials (4), public administrative and labour law trials (5) Stagnate from (2)-(5).

Our world has become more interconnected recently: we travel more, work or study abroad, family members live in different countries, we purchase goods online from all over the World. This new lifestyle requires that we use foreign financial services or we use the products and services of our domestic financial service provider abroad when for example: we make a payment, use ATMs, transfer money, purchase products and services. If things go well, it all seems perfect, however, when something goes wrong, and cross border financial disputes arise, we all want a quick, low cost, effective fix, not to mention we all want to do so in a language we are familiar with. If we face a domestic financial dispute – in which we have a complaint against a domestic financial service provider – we have a choice to turn to the alternative dispute resolution scheme that has

jurisdiction to decide our case, as an example, if both parties to the dispute are residing in Hungary, this forum would be the Hungarian Financial Arbitration Board.[6] As a member of the FIN-Net international organisation, since 2013, the Board is also available for the management of cross-border consumer disputes; accordingly, it helps the respective consumers resolve their disputes with a financial service provider (bank, insurer, investment firm, etc.) operating in a different member state, relying on the alternative dispute resolution forum of the given country or, if this is not possible, find an alternative dispute resolution forum that is able to resolve the case through conciliation or mediation. These cases are the cross-border consumer disputes, the Hungarian rules of which are described in Articles 124-129 of Act CXXXIX of 2013 on the Hungarian National Bank. These rules are applicable when the respective consumer's home address or habitual residence is in Hungary and the registered office, business site or permanent establishment of the service provider is in a different state that is party to the Treaty on the European Economic Area; or the respective consumer's home address or habitual residence is in another EEA state, while the registered office of the organisation subject to oversight by the MNB is in Hungary.

The rules pertaining to the initiation and conducting of the proceedings in the case of cross-border financial consumer disputes are slightly different from the general rules. If the consumer has a home address or habitual residence in Hungary, while the financial service provider is an organisation with registered office in another EEA state, the extra condition for the initiation of the proceedings is the existence of a submission declaration of the service provider, which jointly represents the submission to the proceedings and the preliminary acceptance of the decision. However, in the absence of a submission declaration the success of the resolution of the cross-border dispute is questionable; in such cases the Board's function is limited to providing information and – if the petitioner so requests – forwarding the necessary materials. The Board has to inform the consumer about the alternative dispute resolution forum, participating in FIN-Net and residing in another EEA country, having power and competence in respect of the dispute, as well as on the special rules applicable to the procedure thereof, particularly on the need of preliminary consultation with the service provider and the deadlines prescribed for the initiation of the proceedings. If the consumer so requests, the consumer's petition, recorded on the standard form used in FIN-Net, must be sent to the FIN-Net member dispute resolution forum having power and competence in respect of the proceedings. Upon the existence of a submission declaration, the procedure is identical, with some exceptions, with the domestic procedure, the result of which – if the petition is substantiated – could be a settlement agreement, a binding resolution or, if the petition lacks grounding, the procedure is terminated.[17]

Financial reconciliation is just one example of several alternative dispute resolution areas, the number of which has expanded over the past ten years.

3 Do we want it or not?

A number of important questions arise regarding the nature of the debates, the intentions, the motives of the parties in dispute, the development of the interests that this study considers useful to launch and to collect empirical research in the long run. Basically we can ask that we would like to solve, resolve a conflict or perhaps we want to transform it and regard it asa a opportunity for progression. It depends on interests, motivation and of course on the decision of the parties.

The key question in the process of conflict resolution is that how can the dispute be closed? The key question in the process of conflict transformation is that how can the destructive process be closed and instead wanted to build on it? (examples: new level of connection, connection, restoration of original state)

The sample cases form the year 2013 were examined along the question of whether or not a decision was taken to retain or gain power or trust. Started mediation cases with decision were the same number as without closing 50-50%. According to regulation of mediation we can say that half or half were effective or unsuccessful. Unsuccessful because of closing without a decision, without an agreement.[23]

To the question: do you agree you lose power when you make your decision and it is an agreement/settlement? – the half of the respondents answered that the consensus and the trust did not lose their position, so-called power, the process and its outcome was a good decision and reinforcement.

Figure 5. Case study in ten mediated cases 2013-2018

Conclusions

Conflict management is a creative activity that can be used to develop profitable professional levels in society for individuals, businesses and focus on the dynamism and balance of conflict and harmony. Conflict management is one of the ways of achieving peace. The conclusion regarding the respondents' answers to the above question in this paper is that half of those who begin the procedure will not lose their position and power and the other half will. It is evident from the cases that the result reflects this status: half of the cases initiated were concluded by agreement with the other half without any agreement. Half or half of the cases justify the fact that the participants are moving forward or back to trust or to power. In mediation, turning to trust as a turning is a step forward. This paper aims to be forward-looking in the sense that it emphasizes the importance of trust as a basis for conflict, its management, connectivity and peaceful settlement, as well as all connections -presenting conclusions of the case-related issues with the implementation of case studies by increasing the pattern of cases and pooling experience in different countries.

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EBRD investments in the financial sector of the Serbia

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Abstract: In the world of financial investments, international financing is a key determinant and basis for a bigger and more successful development of small economies in Europe and the world at large. This is a very important role, played by the International Financial Institutions, which are mostly provided by the largest financial investments without the progress of small and backward economies, but potentially prosperous would not be possible. Consequently, we'll try to make this statement in further research in order to look at all the directions of EBRD's financial investments in the financial sector of the Republic of Serbia, and so we make a small review of this sector of the Republic of Serbia.

Keywords: international financing, research, financial sector of the Republic of Serbia

1 Introduction

1.1   Introductory considerations

The European Bank for Reconstruction and Development (EBRD) was established in 1992 to encourage the transition of the countries of Central and Eastern Europe towards a market economy. It should contribute to economic progress and renew its activities by encouraging private and entrepreneurial initiatives. The Bank assists recipient countries by implementing privatization, demonopolization and decentralization programs. Bank's assistance is realized in a number of ways, and in particular direct investments in private or state enterprises and banks or by co-financing investments in companies. In addition, the Bank collects domestic and foreign capital and experienced management for investment in a certain, according to the Bank's assessment of competitive enterprises.

The Bank also provides technical assistance for the preparation, financing and implementation of certain investment projects or capital market development projects, or other structural or sectoral changes that require a transition to a market

economy. The members of the Bank are the European and non-European member countries of the IMF, the European Community and the European Investment Bank.

The Bank's core capital is ten thousand million ecu. In addition to these assets, the Bank performs its activities from borrowed funds, based on repayment of loans or guarantees and profit, or revenues arising from capital investment in an enterprise. With interest, the Bank charges a commission on approved loans and guarantees. The Bank performs its activities of investment and lending, etc. only in the countries of Central and Eastern Europe that are determined to move towards a market economy.

The bank is organized as a joint-stock company. The bank's shareholders are the states. The bodies are the Board of Governors, the Board of Directors and the President with one or more Vice-Presidents. Each Member State shall appoint a single governor and its deputy to the Board of Governors. The Board of Governors decides on the acceptance of new members of the Bank, the increase and reduction of authorized share capital, the suspension of membership, the conclusion of a cooperation agreement with other international organizations, the election of the Director and the President of the Bank, approves the general balance sheet and profit and loss statement, amendments to the Founding Agreement.

1.2   Methodology

In recent years, the world economic and we can probably say the most internal crisis has adversely affected the economics relations within the Republic of Serbia. The inflow of investment was insufficient, but in contrast, the EBRD continued to invest in the Republic of Serbia as well as in other countries of South-east Europe. We conclude that the size of investment at this time for us as a country is insufficient and not in the intensity that we'd like to be, but we've bear in mind the fact that the EBRD is a very important factor in the overall development of our economy and is one of the leading financial institutions that we can say and invest most in the branches of our economy, which can be seen by the number of projects. Most of all, this can be seen in the very branches of investments invested by the European Bank for Reconstruction and Development, of course, infrastructure projects, projects of the very importance not only for the citizens of Serbia and the whole region, which is more important than all the members of the European Union.

Key investments for the EBRD in the near future will be supported to the financial to the financial sector and the corporate sector and investments in sustainable energy projects. Objectives of the work: The social goal of this work is to point out the significance of investments in the financial sector through the recapitalization of banks and the co-financing of various credit lines, as well as the importance of investing funds in the real and public sectors.

The scientific goal of work is to serve the purpose of work as a basis for further research.

1.2.1   Hypothetical Framework

Hypothesis:

▪ EBRD's investments into the economic and financial sector, to contribute the improvement of the growth and development of the economy of the Republic of Serbia. Enable the financial stabilization of commercial banks, other financial institutions, financial stabilization of production and trade enterprises, better energy efficiency and improvement of the living standards of citizens.

Individual hypothesis:

- Recapitalization of banks facilitates better financial sustainability of the banks themselves, and increases the money supply within the undertaking itself.

- In the conditions of the economic crisis, recapitalization is an essential way and a model for banks to provide conditions for further growth and development of loans to the population and the economy.

- EBRD's investments in energy efficiency and infrastructure projects are great importance for the economic viability of the economy of the Republic of Serbia.

- EBRD's investments are necessary in a further measure to improve economic growth and development, however, to this extent and intensity they're not enough for unimpeded growth, but they're definitely important.

1.2.2   Methods and goals

The scientific goal of the research is the scientific description of the stimulation of the development of the investment of funds by the European Bank for Reconstruction and Development in the conditions of the global economic crisis in the economy of the Republic of Serbia. The results of the research should point to the role that the European Bank for Reconstruction and Development has in the development of the financial sector of the Republic of Serbia.

The social goal is to meet the practical needs, ie to find a place in the scientific and educational curriculum in the following period as a justified scientific research work and to use the results of the research in practice, that is, in the financial sector of the Republic of Serbia.

Theoretical methodological approach to research is dialectical. The basic methods of analytical methods, basic synthetic methods, and general scientific methods were applied. From the analytical basic methods, we applied the method of analysis, method of abstraction, method of specialization and deduction method.

The synthetic basic methods we have used in the research are: synthesis, concretization, generalization and induction. We applied the method of data collection and content analysis and factor analysis, as far as the general scientific methods are concerned. Also, the model survey so-called method of experts.

Starting from the set hypotheses and goals of the research, the corresponding structure of work also emerged.

Structure of the Labor:

1. The first part of the paper deals with Introductory Considerations and Research Methodology,

2. The second part deals with the very role of investing the European Bank in the economy of Serbia,

3. The third part of the paper refers to the types of investments in the Republic of Serbia by the EBRD. The third part has a special section deals with the notion of principled implementation of past strategy of EBRD in Serbia,

4. The fourth part refers to the EBRD's significant investments in the financial sector,

5. The fifth part is the recapitalization of the Bank with the help of the EBRD,

6. The sixth final conclusions as well as the basic literature used.

2 Investment of the European bank for reconstruction and development in the financial sector

The subject of this paper is the investment of the European Bank for reconstruction and development in the economy of the Republic of Serbia, with special emphasis on the financial sector. The European Bank for reconstruction and development (EBRD) has been present in Serbia since 2001, when the admission to membership of the then Federal Republic of Yugoslavia was granted.

Since the start of operations in 2001, the total cumulative volume of operations amounts EUR 3.503 billion, while the mobilized co-financing amounts EUR 1.5 billion. Only 5.5% of cumulative commitments are regional projects. Till today, 36.9% of cumulative business volume is in infrastructure, 29.0% in banking and financial institutions, 21.4% in industry, trade and agribusiness, and 12.7% in energy. There is currently an increase in objects, from 166 to 204 projects, which is the result of a constant relationship of investment in the growth and development of the Republic of Serbia.

In the last three years, from 2013 to 2016, the number of projects has increased by 38 projections. When we take a look at the EBRD's investments, which will be explained in more detail in the continuation of the work, we'll come to the conclusion that the total portfolio of the ERBD in Serbia is fairly consistent, so the Bank has invested EUR 2.406.000.000,00 from 2010 to date and by following branches of the economy:

1. Infrastructure EUR 853.000.000,00 which gives 35% of investment

2. Energy Efficiency EUR 390.000.000,00 giving 16% of the investment

3. Financial sector EUR 629.000.000,00 which gives 26% of the investment

4. Industry, Trade and Agriculture EUR 534.000.000,00, which gives 22% of investments
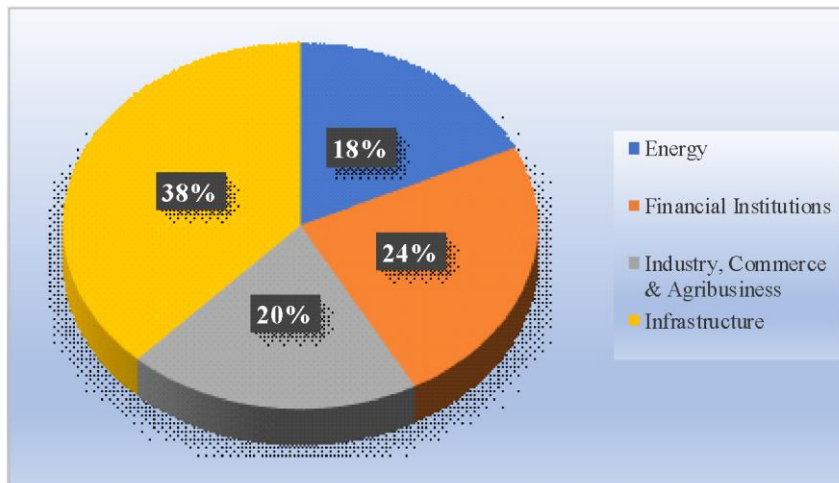
Chart number 1. Portfolio composition
source: ebrd.com

In the Operations business, the bank proceeds from the specific needs of individual countries and reached the level of transition in them. It also concentrates on infrastructure that supports the development of the private sector, such as transport, telecommunications, and energy.

The EBRD has become one of the leading entities in the privatization of the remaining state-owned banks, and in addition to this important role, it launched an action to support pension reform, strengthen institutional capacity and improve the management of private pension funds.

By the bank's first rules, capital can only be used by those countries of Central and Eastern Europe, which have begun to transition to a market economy that

develops the private environment, and the enterprise, and which have in practice accepted the principles of parliamentary multiparty democracy.

The Bank realizes its goals and tasks by granting loans, cofinancing with other financial sources, providing guarantees and technical assistance, primarily to private companies but also to state-owned enterprises that operate under competitive conditions (without subsidies) or are in the process of privatization.

We must emphasize that its scope of work is quite wide and comprehensive, the bank also has business spheres in the social protection sector, medical centers, tourism, energy, aviation, trade, transport, telecommunications, agriculture, all through credit lines, loans, and borrowings .

The Bank can invest in both privately owned and state-owned enterprises, then purchases securities issued by private and state-owned enterprises, and provides guarantees for borrowing on the domestic and foreign capital markets.

The Bank does not enter into export credit and insurance business. During the year, a maximum of 40% of the total investments or placements can be invested in the state sector. The Bank operates on sound banking principles ie under financial conditions that will provide everyone with a profit. reconstruction and development does not finance any project that does not have the support of the member state in which the capital is placed.

For procurement of goods and services, wherever possible, the Bank foresees the calling of an international bidding for suppliers from all countries. The offer should ensure full compliance in accordance with the World Trade Organization's procurement principles. It seeks to enable less developed countries that are not members of the Bank may bid for the Bank's contracts under the same conditions as the Bank Member.

It is very important that we realize that its main task is to improve the economic situation, to influence the growth of the standard of living of the citizens of the Republic of Serbia, and what must be said that it as an EU institution is our biggest partner, and it is very important for the correction of economic opportunities and living conditions of citizens.

The European Bank for Reconstruction and Development believes that sustainable development is a basic aspect of good business management, so that tea for economic growth and a healthy environment is inextricably linked. The Bank attaches special attention to encouraging energy efficiency and resource efficiency, reducing waste generation, rebuilding abandoned industrial sites, renewable resources and reusing resources, recycling and applying cleaner production in funded projects.

In order to define the final list of relevant indicators, which will be included in the budget of the assessment of the level of knowledge of the area of EBRD investment in the financial sector of Serbia, it is necessary, in the next step, to

implement the so- expert judgment. The number of experts who participated in this survey was 7. The opinion of 6 experts was adopted, because the expert under number 5 did not fully evaluate the indicators, and therefore it is not possible to process this data. It was also agreed that the weighting coefficients of the experts are equal and equal to 1. The experts were divided into a questionnaire in the form of a table, which was to be filled in according to the attached instruction from the questionnaire. An expert evaluation would involve evaluating indicators that are in a narrow list of possible relevant indicators.

It is necessary, based on the experts' opinion, to determine the indicators that have the greatest impact on the calculation of the level of knowledge of the area of EBRD's investment in the infrastructure sector of Serbia. The assigned degrees of knowledge (rankings of knowledge) are arranged in the following way:

1	2	3	4	5
no	little	medium	pretty	yes

The calculation of the "rank of knowledge" was carried out as follows. The calculation of the expert assessment for each of the risk behaviors was done as follows:

Table 1. Procedure for calculating the final evaluation of experts

Level of knowledge 1		
Ekspert 1	Ekspert 2	Ekspert n
Rating 1	Rating 2	Rating n
Overall rating		

By calculating the overall assessment (degree of knowledge) of the EBRD's investment area in the Serbian infrastructure sector, the next step is where each category of knowledge is multiplied with an appropriate level of knowledge, and the weights are observed throughout the country. Subsequently, the addition of weightings for each area was carried out, and a "ranking of knowledge" was obtained for each site observed.

Weightings Belgrade = A * **1** + B * **3** + V * **1** + G * **5** + ⋯ + NJ *

"Knowledge Rank" = weightingsbeograd + weightingsnovisad + ⋯ + weightingssubotica

After executing the weighting, data were obtained indicating which of the mentioned areas has the highest degree of recognition of the importance of investing EBRD in our country and submit a proposal for an idea solution in order to improve the understanding of the importance of cooperation with the EBRD and the proposal for future cooperation. The database was arranged for research in

Microsoft Office Excel 2013, in which tables were created and the required charts were removed.

Table number 2. Graphic presentation of the overall evaluation of investment experts in the territory of the Republic of Serbia based on the degree of knowledge and importance

Investments on the territory of the Republic of Serbia	
1. Do you know the degree of development of the financial sector in Serbia?	1
2. Do you know the role of the EBRD in the development of the financial sector in Serbia?	1
3. Do you know the EBRD's investment in the economy and infrastructure of the Republic of Serbia?	4
4. Do you know of some major investment investors (international financial institutions) in the infrastructure sector of Serbia?	4
5. Do you think that the effects of investing in Serbia's economy (especially in the infrastructure sector) are satisfying?	4
6. Do you know the amount of previous EBRD investments in the financial sector?	4

From the table number 2., it can be noticed that the following investments, according to the experts' assessment, are the most important: claims 2,3,4,5,6.

Table number 3. Value of weighted estimates of the importance of investments by research towns

	Beograd	Novi Sad	Subotica	Niš
Assertion 1	16	80	13	36
Assertion 2	16	48	14	26
Assertion 3	84	60	30	18
Assertion 4	100	19	72	115
Assertion 5	104	60	66	19
Assertion 6	108	15	80	100

From table 3 it can be seen that the claims number 2,3,4,5,6 are primary in the city of Belgrade, while in Novi Sad there are claims 1, in Subotica 6, while in Nis, 4,6. The preceding items are also shown in the next chart.
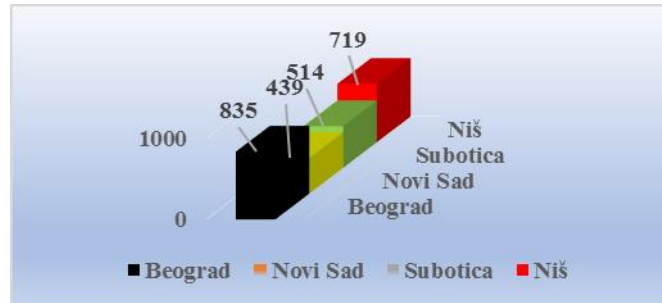
Chart number 2. Displays the distribution of the total weighted weighted value of the valuation of the investment value by the survey cities observed for the four cities

From this chart it can be clearly seen that the city of Belgrade is with the highest degree of knowledge about the importance of investing EBRD in our country, and that it is followed by Novi Sad with a smallest number of degrees.
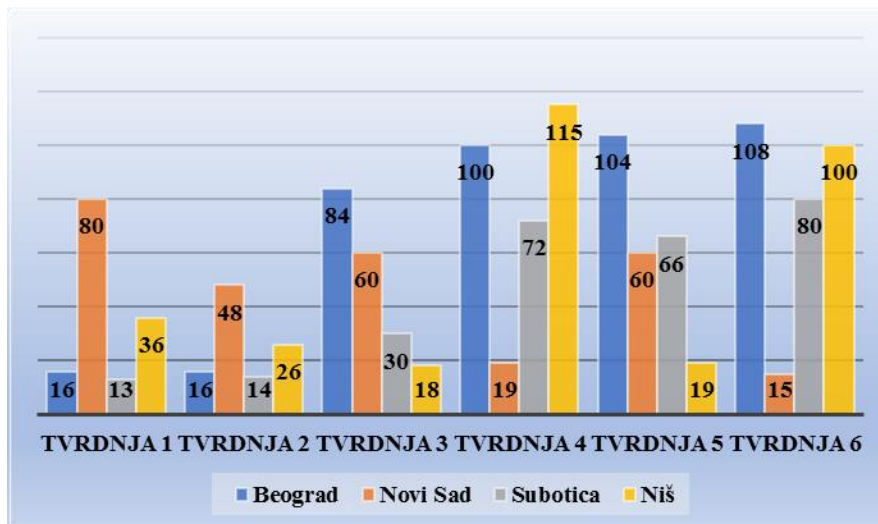
Chart number 3. It shows the distribution weighted value of the investment grade value of the research towns observed for the four cities

Each class of weight factors is assigned a color: black ($100 \geq TF$) - very high value, red ($50 \geq TF < 99$) - high value, green ($1 \geq TF < 49$) - low value. From the chart it can be noted that there are 4,6 claims that are distinguished with the highest degree of knowledge in the observed cities.

3 Investments of the European bank for reconstruction and development

As noted in the previous section, the European Bank for reconstruction and development has been present in Serbia since 2001 when the membership of the then SRJ was approved. Since the beginning of the operation of the European Bank for reconstruction and development to date, the Bank has brought to date four investment strategies. The first strategy was from 2001 to 2004. In this strategy it was primarily an emphasis on the development of the infrastructure sector since the break-up of the war in 1999, as well as projects of great public importance for improving living standards, such as:

- ▪ Project / Electric Power Industry of Serbia, signed and completed. Amount EUR 100.000.000 for the renewal of the electricity network on the whole territory of the Republic of Serbia.

- ▪ Project / Corridor 10, reconstruction of railroads, signed and completed, amount EUR 57.000.000,00.

- ▪ Project / Belgrade Municipality, proposed municipal loan in the amount of up to EUR 121 million, for improvement of city transport, water supply, wastewater treatment and services, district heating in Belgrade. It's signed but not repaid and implemented.

The goal was to finance the needs of public utility companies of the Public Utility Company, Belgrade Water Supply and Sewage, Belgrade Heating Plant, City Transportation Company, all for improving the living standards of citizens.

We must mention here that this was about starting and establishing cooperation between the Federal Republic of Yugoslavia and the EU itself. This strategy from 2001 to 2004 gave results of public importance, since then the cooperation between the Federal Republic of YU and the European Bank for reconstruction and development was started. However, due to outdated legal regulations and the complication of the complicated economic relations that existed in the economy of the Federal Republic of YU.

It's followed by a strategy from 2004 to 2007, which applied to the then State Union of Serbia and Montenegro, and had the following priorities and transitional goals within the Bank's activities:

1. The financial sector, the bank should have focused on the following areas: privatization, financial and operational restructuring of state banks

2. Cooperation with strong local or foreign banks that sought to increase market share by providing further consolidation.

3. Continuous support to commercial banks and institutions for micro-crediting and realization of the then established EU Fund and EBRD for financing small and medium sized enterprises for the countries of the Western Balkans.

Economic sector, several areas have been selected as a priority. Restructuring of companies for privatization after privatization, Capital investments into new technology, and improving the protection of life, mainly with local businesses. Agribusiness, in which Serbia has significant advantages, and many local companies with good financial results and significant market share. Investments with a foreign strategic investor who have commercial and sustainable investment plans and who have successful results for the business.

Regarding the volume of jobs, more than half of the new engaged funds were directed to the private sector, mainly through loans with a strong focus on the domestic financial sector. Investments in equity were mainly limited to the banking sector, and the most significant was the investment in the largest bank state-owned (Commercial Bank) and other investments in the financial sector. In the financial sector, the Bank provided both foreign and domestic banks with mortgage credit line loans and credit lines for small and medium enterprises.

The Bank uses a fund for the development of small and medium-sized enterprises in the countries of the Western Balkans to finance two local banks that are strongly focused on doing business in that segment. Similarly, the first credit line for the leasing sector was approved in 2006 by Raiffeisen Leasing to encourage the development of this perspective sector.

Through this credit line, the bank transferred the funds to the economy to Pro-Credit bank, and that Pro-Credit bank approves micro loans in the maximum amount of EUR 10.000,00 with the maturity period of maximum 24 months, and middle loans are approved in the amount EUR 500.000,00 with a maturity of up to 60 months.

As we've shown the existing investments, we can conclude that the European Bank for reconstruction and development has invested the most in the infrastructure sector, which is certainly one of its main goals and we can say the goals of the European Union, as it's obliged to secure and realize all conditions for achieving goals, which is certainly the modernization and improvement of infrastructure conditions and energy efficiency. In accordance with the investment in the financial sector, transport sector and agriculture are improving the living standards of citizens, and one of the goals of the European Union is to improve the living standard of all European citizens and the European bank for reconstruction and development.

3.1 Implementation of the strategy of the European bank for reconstruction and development for the Republic of Serbia 2007 - 2013

Please note that the EBRD strategy for the period 2007-2013 is extremely important in the establishment of economic relations and consolidation of the budget between certain economic entities that perform their activities in the market of the Republic of Serbia. During the period covered by the existing strategy, the bank signed 166 projects in the amount of EUR 2.58 Billion and mobilized the co-financing of EUR 908 million as of 31 December 2013. Since the start of operations in 2001, the total cumulative volume of operations amounts 3.503 Billion, and the mobilized co-financing of EUR 1.5 Million. Only 5.5% of cumulative commitments are regional projects. To date, 36.9% of the cumulative volume of operations is in infrastructure, 29.0% in banking and financial institutions, 21.4% in industry, trade and agribusiness and 12.7% in energy.

The Bank's portfolio at the end of December 2013 consists of 129 projects with a total value of EUR 2.490 Billion. The total volume of funds disbursed amounted to EUR 1.864 Billion over the period of the current strategy. As a result, the rate of undisbursed funds decreased from 48.5% at the end of 2007 to 40.8% in December 2013. However, there're significant delays in the implementation of a number of public sector projects (Serbian Railways, Roads of Serbia, Serbia Gas and Public Enterprise for Electricity Generation). The amount of bad placements increased from EUR 0.00 Million when the current strategy of 2007 was approved to EUR 41 Million at the end of December 2013.

This strategy was in many ways successful, because it gave clear guidelines and directions in the direction to go. Many financial experts in this field believe that this year there were precursors in the work of the European bank in the Republic of Serbia. Here is an overview of the bank's portfolio in Serbia at the end of December 2013. We think that the European bank for reconstructions and development made a remarkable contribution to Serbia, without its support, all aspects of business would not be improved.

Here we present an overview of the Bank's portfolio in Serbia at the end of December 2013.

Table 4: Overview of the Bank's portfolio in Serbia in December 2013

SECTOR			NET CUMULATIVE BUSINESS VOLUME		
In millions of Euro	Number of projects	Total Project Costs	EBRD signed	EBRD% of total	Number of projects
Energetics	9	724	445	12.7 %	9
Natural Resources	1	150	150	4.3 %	1
Electricity and energetics	8	574	295	8.4%	8
Financial institutions	64	1.283	1.017	29%	44
Banks	54	1.113	925	26.apr	36
Leasing companies	6	85	70	2.0%	4
Non-banking financial institutions	4	85	22	0.6 %	4
Industry, trade, agribusiness	79	1.612	748	21.4%	53
Agribusiness	30	835	459	13.1%	18
Private equity funds	16	209	42	1.2%	14
Information and communication technologies	7	86	47	1.3%	4
Production and services	15	293	135	3.8%	9
Real estate and tourism	11	188	66	1.9%	8
Infrastructure	24	3.952	1293	36.9%	23
Communal infrastructure for environmental protection	12	934	370	10.6%	11
Transport	12	3.018	923	26.3%	12
In total	176	7.572	3.503	100%	129

Table 4 coninually

SECTOR			EXISTING PORTFOLIO			
In millions of Euro	Number of projects	Total Project Costs	Portfolio	% of portfolio	Operational assets	% of assets
Energetics	9	724	367	15%	114	8.0%
Natural Resources	1	150	145	6.0%	45	3.0%
Electricity and energetics	8	574	222	9.0%	69	5.0%
Financial institutions	64	1.283	642	26%	566	39%
Banks	54	1.113	578	23%	528	37%
Leasing companies	6	85	41	2.0 %	21	1.0%
Non-banking financial institutions	4	85	22	1.0%	16	1.0%
Industry, trade, agribusiness	79	1.612	433	17%	297	21.0%
Agribusiness	30	835	266	11%	177	13.0%
Private equity funds	16	209	31	1.0%	11	1.0%
Information and communication technologies	7	86	19	1.0%	11	1.0%
Production and services	15	293	71	3.0%	58	4.0%
Real estate and tourism	11	188	46	2,00%	31	2.0%
Infrastructure	24	3.952	1.048	42.0%	454	32.0%
Communal infrastructure for environmental protection	12	934	286	11.0%	185	13.0%
Transport	12	3.018	762	31.0%	269	19.0%
In total	176	7.572	2.490	100%	1.431	100%

We can see that the Bank's activity is extremely high, and that it can be safely stated that its business is consistent and adequate to all EU interests. The investment volume is very significant.

3.2   Realization of EBRD Investments in the Republic of Serbia

From year to year, the bank invests a lot of funds in order to stimulate timely growth in investment. It monitors the trend of investment of funds through years

of timely investment and by number of projects, where in recent years the intensity has fallen in both segments.

Table number 5: Investments over the years

Year	Value in millions of Euros
2010	533
2011	598
2012	269
2013	424
2014	453
2015	478
In total	2755
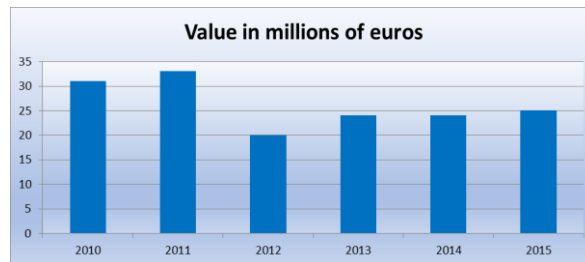
Chart number 4. Annual EBRD investments in the Republic of Serbia in million Euros.

We need to notice without explaining the graph and the table presenting the existing results that in recent years the intensity of the investment has decreased, the place to grow, we think that many factors have influenced the fact that the value of the investment is reduced, which is extremely important in order to be in the next years, they have seen the results of investing in the strategic goals of the Bank itself in the Republic of Serbia.

Table number 6.: Number of projects per year intervals

Year	Number of projects
2010	31
2011	33
2012	20
2013	24
2014	24
2015	25
In total	157

4 EBRD investments in the financial sector

As we said in the previous part, the European bank has invested a lot of funds in the financial sector. From 1 January 2010 to 31 October 2016, the European bank for reconstructions and development invested EUR 636.000.010,00. The financial sector is a very important segment and indicator of the development of the Republic of Serbia and the living standards of its citizens. The biggest transition challenge was the strengthening of the banking sector and the further development of financial mediation through the following steps:

1. Banks need long term funding and institutional support that will help them to operate on a sustainable basis.

2. Access to finance for SMEs has been significantly more difficult during the crisis. It's necessary to encourage micro lending by commercial banks and micro-credit institutions. There is no regulatory framework for microfinance.

3. The crisis has caused two major problems in the financial sector that require an urgent reaction: The growth of problem loans and the disbursement of the deposit insurance fund.

4. The largest part of banks' assets and liabilities is indexed and denominated in EUR. Previous attempts to encourage dinarization, stimulating dinar lending and dinar savings had limited results.

5. There is a need for further consolidation and privatization in the sector in which 29 banks operate, of which 5 have 50% of market share, 11 operates with losses and 6 are state-owned.

6. There is a need for development of a healthy insurance sector and more significant financing of non-banking financial institutions, primarily leasing companies and investment funds.

The bank has expressed the view that it'll support banks, financial institutions, leasing companies, in order to encourage the availability of long term financing sources, and encourage the introduction of new financial products, all through a long-term form of financing and securing products tailored to their needs in order to increase the availability of loans for micro, small and medium enterprises, and supported the development of energy efficiency, renewable energy sources and the agriculture sector.

The EBRD wants to increase its confidence in the banking sector by striving to support the deposit insurance agency that is responsible for the deposit insurance fund in order to increase the level of trust in the banking sector. That's all because of the fact that the MMF and the world Bank are working to establish a regulatory framework for the bank's resolution, including a strategy for state banks, because this is an extremely important issue. EBRD has cooperated with almost all banks in the Republic of Serbia and almost the largest banks have signed agreements and

projects to achieve cooperation and to fulfil all the important goals that it EBRD has.

We'll dial a few:

1. Adiko Bank, EBRD credit line in the amount of EUR 30.000.000,00. Higher loan intended for further financing crediting micro, small and medium sized enterprises in accordance with policy and statement on lending to MMSP in the Republic of Serbia. Signed on November 10 2016, the very beginning project must be in January 25 2017.

2. Commercial Bank, EBRD credit line in the amount of EUR 30.000.000,00. The EBRD is considering extending this loan to 3 years to promote the development of the SME sector. The loan will be used to provide short term and medium-term financing to craft and investment funds to private small and medium enterprises. It was signed on November 6 2015 and started with this line on December 25 2015.

3. Bank Intesa Belgrade, a credit line of EUR 30.000.00. This is a credit line that's intended for the borrowing of natural persons. The load was signed on October 23, and officially started with this credit line on December 9 2015.

5 Recapitalization of "Cacanska" bank

At the general meeting of shareholders of "Cacanska" bank in December 2010, a decision was made on the closing issue of shares to the European bank for reconstructions and development and the international finance corporation. This process was completed in early April 2011 by payment and subscription of shares in the central the Register of Securities, which increased the bank's portfolio by EUR 8.000.000,00.

Recapitalization is a strengthened capital base of the bank and te potential for new credit lines for small and medium enterprises has been created. The ultimate goal of recapitalization is to better prepare the Bank, its development and strengthen the market position for privatization in the future. The recapitalization of "Cacanska" bank started with the approval of the closed share issue of the shared of EBRD and IFC in December 2010, the process of which ended with the payment of funds and the subscription of shares into the central securities register. The "Cacanska" bank's capital is increased by around EUR 8 Million, issuing a new 36.4% of the shares. The EBRD has bought 12131 shares holding a stake in this bank of 19.99%.

After the recapitalization, the share of the Republic of Serbia was reduced to 28.5%. But, when a recapitalization contract was signed, the Republic of Serbia retained the right to recapitalize this banking institution in the next two years in

order to retain the ownership share of 38.8% which it had previously. In 2010, "Cacanska" bank recorded a stagnation of business by earning interest income of 1.97 dinars, an increase of 0.7% compared to the previous year, while the fee and commission income was 3.2% higher and amounted to 496.2 Million dinars.

At the end of 2010, the assets of "Cacanska" bank amounted to RSD 28.7 Billion, which is an increase of 30% from the beginning of the year. After the new issue of shares was announced, and the market capitalization of this banking institution amounts to 2.73 Billion dinars.

27th of May 2015 Halkbank became the majority owner of "Cacanska" bank, paying EUR 10.1 Million for a 76.74% stake in the share capital, and pledged to pay the amount in cash and in total when transferring ownership of shares. These funds were in proportion to the number of shares owned by the previous owners, the Republic of Serbia was EUR 3.7 Million, the European bank for reconstruction and development EUR 3.3 Million, the world financial corporation EUR 2.6 Million and the Belgrade bank in bankruptcy EUR 0.4 Million.

Here we will show how the ownership structure of the Cacak bank looked like after the Second Recapitalization.
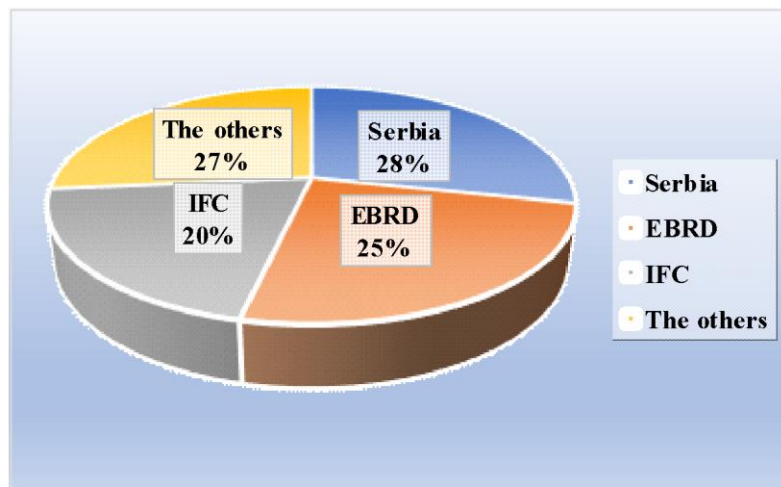
Chart number 5.: Ownership structure of Čačanska Banka after the II capital increase.

We will show the balance sheet as of 31.12.2012. And here you can see the situation that existed in the Bank's business.

Table number 7.: Balance Sheet as at 31.12.2012. (in thousands of RSD)

ASSETS	2012	2011
Cash and cash equivalents	3.005.508,00	1.643.736,00
Revocable deposits and loans	4.630.454,00	5.997.352,00
Receivables from interest, fees, sales, other receivables.	153.935,00	145.991,00
Give loans and deposits	22.593.427,00	20.195.266,00
Securities	1.156.808,00	1.176.396,00
Share (participation)	18.288,00	18.265,00
Other placements	130.765,00	120.567,00
Non-material investments	24.405,00	24.464,00
Fixed assets and investment property	814.745,00	844.852,00
Deferred tax assets	19.644,00	18.627,00
Other assets	284.028,00	205.145,00
TOTAL ASSETS	32.832.007,00	30.390.661,00
PASSIVE	2012	2011
Transaction deposits	3.594.744,00	3.153.475,00
Other deposits	13.084.632,00	11.409.936,00
Received loans	8.405.382,00	8.030.456,00
Liabilities based on interest, fees and value changes	16.301,00	20.033,00
Reservations	124.644,00	126.197,00
Liabilities for taxes	1.921,00	1.678,00
Liabilities from winnings	0	1.335,00
Other obligations	2.526.739,00	2.623.211,00
TOTAL LIABILITIES	27.754.363,00	25.366.321,00
Capital	3.048.483,00	3.048.483,00
Reserves from profit	1.660.893,00	1.538.166,00
Revaluation reserves	318.376,00	314.963,00
Gain	49.892,00	122.728,00
TOTAL CAPITAL	5.077.644,00	5.024.340,00
TOTAL LIABILITIES	32.823.007,00	30.390.661,00
OFF-BALANCE POSITION	12.756.783,00	10.912.439,00
Operations in the name and for the account of third parties	279.697,00	285.757,00
Future commitments made	5.956.110,00	6.594.369,00
Guarantees received for commitments	0	0
Derivates	1.646.400,00	0
Other off-balance sheet items	4.874.576,00	4.032.313,00

Table number 8.: Income Statement for the period 01.01.-31.12.2012 and 2011 (in thousands of RSD)

POSITION	2012	2011
REVENUES AND EXPENSES OF REGULAR BUSINESS		
Interest income	2.089.242,00	2.190.310,00
Interest expense	991.656,00	994.640,00
Profit from interest	1.097.586,00	1.195.670,00
Fee and commission income	621.566,00	541.180,00
Fee and commission expense	62.398,00	52.578,00
Profit and commission income	595.168,00	488.602,00
Net gain on the basis of selling securities at fair value through profit and loss	16.388,00	0
Net loss on the basis of the sale of securities at fair value through profit and loss	0	6.270,00
Net profit from sales of other placements	2	0
Net foreign exchange gains	0	2.334,00
Net exchange rate differences	1.251.175,00	0
Income from participation	724,00	4.593,00
Other operating income	11.572,00	4.192,00
Net expenses on the basis of indirect write-offs and placements and provisions	592.263,00	529.245,00
Wages, salaries, and other personal expenses	455.094,00	414.717,00
Depreciation costs	87.680,00	79.411,00
Operating and other operating expenses	515.775,00	525.872,00
Income from changes in the value of assets and liabilities	2.501.067,00	1.766.812,00
Expenses from the change in the value of assets and liabilities	1.277.535,00	1.776.459,00
Profit from regular business	56.985,00	130.229,00
Result of income	56.985,00	130.229,00
Income tax	8.109,00	9.762,00
Profit from deferred tax assets	1.016,00	2.261,00
PROFIT	49.892,00	122.728,00
Basic earnings per share (in dinars without money)	274	724

During the second recapitalization of the EBRD's position, it was not for them to make investments themselves, but it must be co-financed with another international financial institution, there was a need to include the IFC that was done.

Looking at the operations of Čačanska Banka in 2012, we concluded that the assets for 2012 increased in comparison to 2011, the profit was significantly

reduced in relation to 2012 compared to 2011, and we can omit derivatives for 2011 which is not the case for 2012.

Here, according to the balance sheets, it can be advectively concluded how the situation was at that time.

27 May 2015 Halkbank became the majority owner of Cacanska banka, paying EUR 10.1 million for a 76.74% stake in the share capital, and pledged to pay the amount in cash and in total when transferring ownership of shares. These funds were in proportion to the number of shares owned by the previous owners, the Republic of Serbia 3.7 million, the European Bank for Reconstruction and Development 3.3, the World Financial Corporation 2.6 and the Belgrade Bank in bankruptcy 0.4 million euros .21 Thus, the organizational structure used to be Čačanska banka and now Halk Bank looks like this:
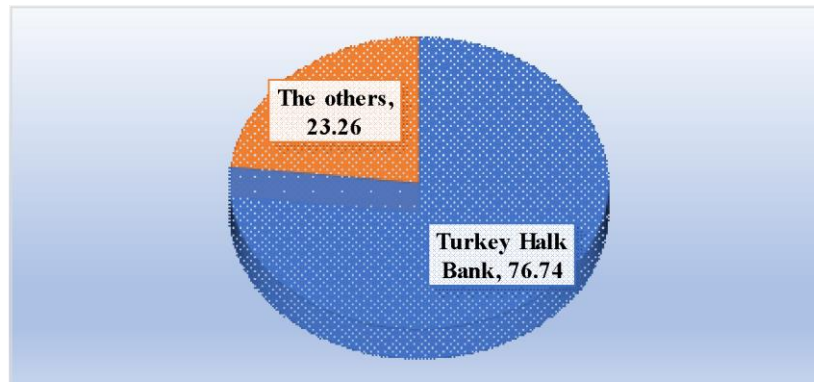
Chart number 6. Ownership structure of shares of Čačanska banka after purchase of shares package by Halk Bank on May 27, 2015.

6 Conclusion

We draw conclusions from the previous research that the Serbian financial sector, in particular its banking part, would not be able to get out of the crisis, and thus contribute to improving the conditions of business within it. Therefore, the role of the EBRD, which was here to contribute to growth and the development of the financial sector, is very important. EBRD has greatly contributed to the improvement of business and prevented all negative aspects that would lead to a complete collapse of the Serbian Financial Sector.

The EBRD's investment in the financial sector has substantially improved all domains of borrowing in the financial markets and ensured the stability of the financial markets. With the offers of credit lines that the EBRD entrusted to

domestic banks, citizenship of the Republic of Serbia has benefited from the possibility of easier access to monetary sources that it could use. EBRD is a true and powerful partner in the Financial sector, but also in all sectors of business in the Serbian economy, its capacities and power have greatly helped to preserve the stability of the Serbian economy and without it the situation would look completely different.

EBRD support at the right moment arrived to the Republic of Serbia and its financial sector and thus ensured the long-term stability of its operations. It was a crucial time interval and it is very good that banks are recapitalized.

The annual report of the European bank for reconstruction and development on the progress of reforms and economic development in 29-member states from Central Europe and Asia says that the global crisis has led to a significant reduction in support for democracy and market economy in most of the developed countries of the region. Continued to provide financial support to the Republic of Serbia in 2017 and 2018, and the funds will primarily be directed to support the development of the financial sector, the development of infrastructure, agribusiness, local self-governments and the strengthening of small and medium sized enterprises. The EBRD closely monitors the implementation of all its projects as well as the current business situation in the market, especially in the projects it finances itself, in order to meet all the standards of the business norm. In the financial institutions of investment, investments are made through equity participation, in the example we have mentioned to "Cacanska" bank and through loans serviced by banks mainly to small and medium enterprises, then to the development of agribusiness, telecommunications.

We can conclude that its presence in the Republic of Serbia is very significant and it cannot be said that its support is not comprehensive. The EBRD takes the lead role of the partner of the Republic of Serbia in the development of the financial sector and the capital market. What can definitely be noted is that cooperation with the European bank for reconstruction and development is extremely important. Without the support of the EBRD, the success in the financial sector would not be achieved.

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The European Migration Crisis and the aspects of Security Politics

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Abstract: According to the political events in Europe, in the recent years, Security Politics has become a crucial field in academic research. Some of these events have influence on the narrative in social policy on the continent (e.g. definitions about refugee status, the solidarity question, the cost of shelter etc.). I would like to clarify the basics in order to dissipate the misconceptions. The essential parts about these the Geneva Convention of 1951 and the Schengen Treaty.

Keywords: European, migration, crisis, security politics, legal security

1 Introduction

Since the Second World War, there has been no open armed conflict in Europe, so we are inclined to live in the misconception of peace in the world. In the Middle East over the last decade, with the Arab Spring events, as well as the ensuing refugee flow and the migration process that has begun in the Americas today, can bring us many questions. There are never-before-seen masses in motion, which have many reasons. Media penetration and political dominance have widened the communication channel that we have become accustomed to, and the tools that are well-used in mass media have also appeared as the new media. Many community sites and forums that radically changed their unilateral communication (festive speech, radio and television), giving people the opportunity to post their opinion at mass media. In my research, I look for similarities in the present-day appearance of past events, which is decisive for the development of both domestic and European public life. The European refugee crisis and its security aspects are one of the most crucial issues for the continent, which can define our future for decades. Just to highlight a few: political stability, economic power, public security, military force and border protection, geopolitical position, and the sustainability of international conventions.

2 Security Science and Security Politics

2.1 Starting point: International Affairs and Marketing

In the recent years, the term of 'security' has been formed as an aspect. That is obvious, because the world continuously changing. But we have to declare, that security has become also a status. A status where upon we mean the calm state of the society, where the people of a country, can feel themselves in a safe environment. Opposing that, defence is a much more different term. Defence means the summary of actions in order to how we guarantee this tranquillity.

At the start of the research I have found the fact, that Security Science is a field that has no such literature in specific yet, but there are side fields, which are contain such useful knowledge, that will support this one. Basically, in keywords we can find information at Security Studies, Security Policy and International or Foreign Affairs or Relationships, but if we search for Security Politics, we meet with a dead-end. Generally, scientific fields require a connection with others in order to apply as science, so that requirement has been already fulfilled.

The Copenhagen School [3] declares five sectors which must be included in scope of researching security and these are the following: political security, economical security, societal security, military security and environmental security. When I was reading these, I have recognized the PESTEL analysis' logical structure immediately, but one element was lacking. It was the "L" part of the model, the law environment. As we see the events from the start of the "Arab Spring", we can state, that this sector must be in focus when we talk about security. So, I have decided to make a model, that includes a new sector, described as "legal security".

I have been revised the upgraded model and defined the new six sectors from another point of view. In my opinion, at the technology part we should mention as Foreign Defence, which has the technological background to guarantee the safety for a society. At the section of environment, on the first hand, we think about prevention (e.g. preventing a natural catastrophe), but we should put the focus more likely on geopolitical forces changing throughout time and space.

2.2 The Geneva Convention and the Schengen Treaty

The Convention [1] is a general referring point in the discussion about the relation with refugees, and well often with the mass migration of people. The negotiators' opinion usually different about the status of these people, and they cling on purposes of the treaty, but they forget to mention deeper parts from this. I would highlight Article 31, where has been declared, that Contracting States (member states of the treaty) will not apply penalties against refugees (people whom life is

in great danger) without permission to pass their border, but there is a 'tiny' detail. The refugees must show themselves in front of authorities without delay, with a good cause of the illegal trespass.

And this last point is crucial the get a better view about the events happened in the recent years across Europe. When the mass of people has been arrived on the borders of the EU, this sign of good cause did not show up. And why not? Because most of cases, they were not about fled from war. After the murder of the Libyan dictator, Muhammar Gaddafi (the moment has ended officially the First Libyan Civil War), people from the Sub-Sahara region were able to pass the Libyan coasts to evade from Africa. They have been informed, that Syrian refugees are welcome in Germany, so they have lived with the opportunity, with the aid of smuggler networks and humanitarian organizations crossed the Mediterranean Sea, and by walk started a trip to Western Europe, where their 'invitation' has been made.

The sign of good cause, which has been mentioned above, none of the following events appeared. On the regularly basis, the 'refugees' throw away their official documents, and wherever they arrived, demanded to take or direct towards to Germany. When the masses met on the Balkans, nearly everyone was from Syria. Authorities tried their best to identify them, but on the number of asylum seekers, governmental forces have been outmatched greatly.

There is a conflict between the UNHCR Report of 2015 [13] and the events occurred between 2011 and 2014. The report states, that long stay has been established for refugees with the enable of the closed camps, but this statement violates with the islamist attack on the US Embassy of Libya, and the death of the US Ambassador and three others on the events of Benghazi Attack, 2012 [2].

The Schengen Treaty is a very interesting one when we talk about the European migration crisis. First of all, there a few misconceptions about the treaty, what makes the discussion difficult. At basic human rights, and in the Geneva Convention, there are references with the "freedom of movement", which sometimes get connected with the Schengen Area's legal systems. Influencers time to time try to merge these agreements like we talk about the same thing, showing that a refugee has the right to move anywhere, anytime just as he or she want to.

First things first. According to Article 26 from the Convention, refugees has the right to decide their residential place to live, which is acceptable. But there is a crucial condition: they are staying on a Contracting State's territory in a lawfully status!

The first two paragraphs of Article 29 state that all applications for asylum submitted in one of their territories are processed but the second paragraph also provides that it is not obliged to authorize entry or residence in the territory of a Contracting Party by virtue of that obligation. They reserve the right, on the basis

of their national laws and international agreements, to reject the asylum seeker in a third State in the event of rejection [4].

The majority of people leave their homes because of conflicts and violence, so they flee to Europe. More than 12 million people are in need of human rights assistance, and more than 4 million people have left the country according to UN surveys. The Iraqi population suffers from the conflicts generated by the Islamic State, so 4 million Iraqis have been threatened within and outside the borders by the UN Asylum Committee. In Crimea, Afghanistan, Somalia, South Sudan and the Central African Republic, Mali, Nigeria and Eritrea, millions of millions of civilians were forced to leave their homes and seek shelter in Europe or elsewhere [9].

But within the masses, there are potential terrorists, and economic migrants, whom coming with a purpose to change the Christian Europe in any way. They are coming for the welfare, and well build social system, they are heated with religion, and radical views to ensure they will. There is chaos wherever they move, and their purposes are not friendly. Making political parties across Western-Europe, they have the base for voters (millions in numbers), making great praising events on the streets of European metropolitan cities, and they won't go home. We are in war that is clear as the sky, and our enemy is not a state, more as an ideology, sadly with Western supporters.

2.2.1 The Sectors of Security Politics model

The science field of research is security science, and it deals with security policy issues. 2018. Q3. in order to provide a comprehensive security policy analysis of the risks associated with the European refugee crisis, which can be used later in the assessment of security policy measures.
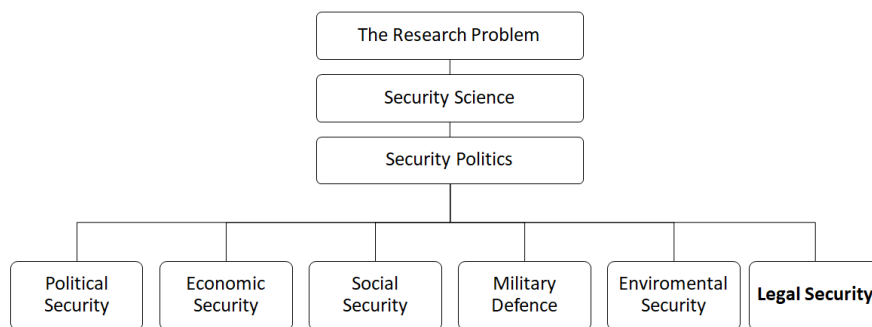
Figure 1 The SSP model

Given the specific nature of the discipline, however, during the research process, important reference bases (political declarations, legislatory plans or

modifications, international meetings etc.) will be taken during the course of the research, which cannot be ignored in the subject.

I think that because of the short time that an event occurs, it cannot become a stable reference basis, so I would like to point out that in my research I never attributed importance to the fact that a scientific discovery, result or thesis how long alive in the regular mindset. Nowadays the scarcity of time in some areas in formulating effective responses does not allow decades to come to an end when a position is approved.

2.2.2 The SSP matrix

With the help of a "PESTEL analysis of security science", I try to address the main relationships that cover the security policy issues of Hungary and the European refugee crisis.

Use the following table to summarize the test criteria

The European migration crisis	Potential macro level risk
Political Security (P)	*Soverinity of the nation states*
Economic Security (E)	*Socal systems downfall, demographical challanges*
Social Security (S)	*Risks on criminal activites*
Military Defence (T)	*Uprising risk in connection with Border Control*
Enviromental Security (E)	*Geopolitical forces imbalance*
Legal Security (L)	*Stability of the International Treaties*

Figure 2 The SSP matrix

My approach is primarily different from the general belief that I handle the legal field in a separate category (sector), which is not mentioned in the Copenhagen school, it does not constitute an independent safety factor. I find it important to note that with regard to events taking place today, the question of whether or not we can keep up the international conventions is becoming increasingly decisive. These conventions are agreements between the states, in which, if there is an

injury, there are serious disagreements over the other five factors mentioned above.

The European Union is an independent nation-state alliance that addresses security issues on an independent, sovereign risk assessment basis. However, there are endeavours to try to take measures against the provisions of the basic treaty, the end result of which will inevitably lead to conflicts, not excluding armed conflict.

3 Legal Security as a crucial field in Security Politics

3.1   From revolutions to wargames

I have read about the causes of the start over of the messes, but how did we arrive from the revolutions to the wargames held in different regions around the globe? The question is simple. Geopolitical powers are included in the events occurred in Northern-Africa. The NATO intervention is the First Libyan Civil War, the support of the Governmental Forces in Syria (by the Russian Federation), and the trials of a peace treaties by Geneva [10] and Astana [11] process. At the first one, the main characters are the UN and the Syrian Government's Ambassadors, whom sit down to settle things about a long-term ceasefire, but it has been failed. On the other part Russia, Turkey and Iran's presidents settled to agree upon a solution, to get rid of the conflict in the area. They have declared that they make deallocated zones to corner the rebel forces, one of them was the famous Idlib county. Between these peace processes another 100 000 more people fell in the conflict.

About wargames, we can state that the world has never seen one since the end of Cold War. In Vostok 2018 [7] (key members Russia, China and Mongolia) between September 11 and 17 in the Eastern part of Siberia, there were 300 000 (Chinese participate 3200 troops) active military personnel, 36 000 military vehicles, 1000 aircrafts, 80 vessels. In opposition that, Trident Juncture 2018 [12] (key members 31 NATO members) between October 25 and November 7 in Norway, there were 50 000 participants from 31 countries, involved 250 aircraft, 65 vessels and 10 000 military vehicles.

Analysing the figures, we can saw an approx. 5 times higher multiply in the number of personnel, 3 times higher vehicles, and nearly equal number of vessels. But, underline the fact, that the tools which has been deployed far away from each other when we talk about technological levels.

3.2　War in the shadow of Europe

Before the protests, it should be noted that the social tensions were already coded, as the public was divided on the side of the site, which is also characterized by territorial location. Western regions are typically EU members, while in the eastern regions, Russia has been sympathetic to the majority.

The Euromaidan revolution was the starting point in the Ukraine-Russian conflict, where were a protest on one of the main squares of Kiev. The protesters rallied against the current regime and demanded their connection to the EU. Between February 18 and 23, 2014, in the capital of Ukraine (on Maidan Nezalezhnosti Square) began with demonstrations followed by clashes with the police. The authorities initially tried to establish rubber-based weapons and tear gas, but later they used sharp weapons (Kalasnyikov) and blinding grenades. In the first days a total of 25, where 16 civilian and 9 policemen died in the clashes [6].

Following with the 2014 Russian invasion on the Crimea was followed by an EU embargo (31.07.2014), which prohibited the sale of dual-use goods, services and technology, the end use of which is partly or entirely to achieve military objectives. If the end user is the Russian Army, dual-use goods and services should be considered as being sold for military purposes [5].

During the four years of war it has demanded more than 10,000 people's lives, and there was no sign of a collapse of the conflict in addition to the billions of dollars in losses. Western media focus on Russian influence, but at the same time ignores the war between Moscow and Western democracy in Dombass [8].

But why the West is letting this to flow on its own? The answer is simple. As long as Russia can be highlighted as an aggressor, the EU can point on them. And who will be bearing the cost? Ukrainian civilians. The next year spring there will be a vote for presidency in Ukraine, so the EU won't part in the campaign any way, just as the Russian President who had a statement about it in the recent weeks.

Conclusions

At all we can declare, that we are facing a threat of war around us, and the migration crisis is part of it, it is piece of a bigger puzzle. The most important studies and textbooks in the literature deal with the vast majority of them, but typically characterize the conditions typical of the Cold War where no technological tools were available such as what is nowadays natural and with narrativity we have to be careful when the typical challenges of our time we try to define it. My personal conviction is that security science and its closely related security politics will be a decisive area for the coming years, as we can see that in the world there is not only an economic and military conflict, but also a communication and diplomatic nature, in the background of which potential motivating factors can be explored. Regarding the methodology of the analysis, I have chosen the PESTEL logic because this method can represent in a fairly

detailed way what is happening in everyday life. I would also like to draw attention to the issue of legal security, which has been on the agenda many times in public in recent years, a preferred reference point for managing political processes when decisions are made on international agreements and then surprising statements come alive after which press releases are published. These affect the views of opinion leaders and those in power, but not least of the civilian population. Finally, I find it important to be able to manage the sequence of events in a system that will enable us to highlight geopolitical events, even if in the vast majority of cases there is no way and opportunity to do so, we must strive to explore them.

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Opportunities and dangers of self driving cars

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Abstract: Nowadays the issue of self-driving cars has become quite recent almost everywhere in the world. Despite the fact that automakers are working on their development and increasing the level of security, this level does not give complete security to its users. In this study we are dealing with the positive and negative sides of self-propelled cars, because we believe that these cars do not currently have sufficient confidence, which is an important element in many ways.

Keywords: self-driving cars, automation levels, opportunities, dangers

1 Self-driving cars

Autonomous cars are those vehicles which are driven by digital technologies without any human intervention. They are capable of driving and navigating themselves on the roads by sensing the environmental impacts. With the help of the system built up by different sensors, hardware components and a complex software, the car can go from one place to another safely. Their appearance is designed to occupy less space on the road in order to avoid traffic jams and reduce the likelihood of accidents [10].

1.1 Levels of autonomy

In transport, the human factor has a prominent role beside the vehicle and environmental conditions, as one can correct the mistakes and shortcomings of the other two factors. To track what's happening as we make the transition from human to robot drivers – a transition that will have enormous repercussions for the way we live, work and travel in the future-, the National Highway Traffic Safety

Administration (NHTSA) adopted the levels of the Society of Automotive Engineers for automated driving systems, which provides a broad spectrum of total human participation to total autonomy [13].

Figure 1 Types of autonomous vehicles [1]

These are the levels of SAE:

Level 0: No Automation [1]

In this case, there is 100% of human presence. Acceleration, braking and steering are constantly controlled by a human driver, even if they support warning sounds or safety intervention systems. This level also includes automated emergency braking.

Level 1: Driver Assistance [1]

The computer never controls steering and accelerating or braking simultaneously. In certain driving modes, the car can take control of the steering wheel or pedals. The best examples for the first level are adaptive cruise control and parking assistance.

Level 2: Partial Automation [1]

The driver can take his hands off the steering wheel. At this level, there are set-up options in which the car can control both pedals and the steering wheel at the same time, but only under certain circumstances. During this time the driver has to pay attention and if it is necessary, intervene. This is what Tesla Autopilot has known since 2014.

Level 3: Conditional Automation [1]

It approaches full autonomy, but this is dangerous in terms of liability, so therefore, paying attention to them is a very important element. Here the car has a certain mode that can take full responsibility for driving in certain circumstances, but the driver must take the control back when the system asks. At this level, the

car can decide when to change lanes and how to respond to dynamic events on the road and it uses the human driver as a backup system.

Level 4: High Automation [1]

It is similar to the previous level, but it is much safer. The vehicle can drive itself under suitable circumstances, and it does not need human intervention. If the car meets something that it cannot handle, it will ask for human help, but it will not endanger passengers if there is no human response. These cars are close to the fully self-driving car.

Level 5: Full Automation [1]

At this level, as the car drives itself, human presence is not a necessity, only an opportunity. The front seats can turn backwards so passengers can talk more easily with each other, because the car does not need help in driving. All driving tasks are performed by the computer on any road under any circumstances, whether there's a human on board or not.

2 The outcome of the changes

To examine the influencing positive and negative factors for the acceptance, we collected the most important ones.

Public transport

Everyone likes to travel comfortably, so in case that everyone starts driving a self-driving car - those who used public transport before as well-, because it is much cheaper than a taxi, that will cause even bigger traffic jams. In Budapest, 60% of people travel by public transport and there are still plenty of cars on the road. Public transport vehicles are designed to accommodate as many people as possible, while cars can only accommodate 4-5 people [17]. We think that traffic jams can be reduced or even eliminated if public transport remains at least at the same level and further will be developed.

Environmental effect

Transport is currently one of the most important factors of greenhouse gas emissions and pollution. Autonomous vehicles are designed for fuel efficient operation, thus reducing environmental pollution. Using these cars, travelling will become more comfortable but in the future it is important that besides people want to travel more comfortably they need to understand that car sharing is necessarry

because it also has a positive effect on the environment, not just to avoid traffic jams.

Reduction of accidents

One of the main benefits of self-driving cars is that they filter out human errors, which will reduce the number of accidents. As we examined the data of KSH, it can be seen that 93% of the accidents are caused by the driver, so if it could be filtered by using automated cars, the number of accidents would be greatly reduced [6].

Jobs

Many people are worried about losing their jobs, as some jobs will be removed / transformed by introducing self-propelled cars slowly. Which does not mean that all truck drivers, taxi drivers, bus drivers, etc. will be unemployed, just reallocating to other segments [14].

Hackers

In our opinion this issue is the most dangerous one because each computer that can communicate with an other one become accessible. In the recent years, many news came out that hackers broke into various databases, infected computers with viruses, and there were a number of terrorist acts around where cars were used as tools. Computer-controlled vehicles will increase the chances of these acts.

Malfunctioning

Everybody who has used some kind of computer device may have noticed that an unexpected error may arise for no reason. These failures are becoming more and more rarer, but if it happens at a high speed on a crowded road, it is no longer so harmless.

Examining the opportunities and dangers we can see that there are overlaps, everything is a matter of comparison, so a potential positive thing can be a source of danger. In the following figure, we illustrate the overall assessment of the collected factors as they are considered as negative or positive.
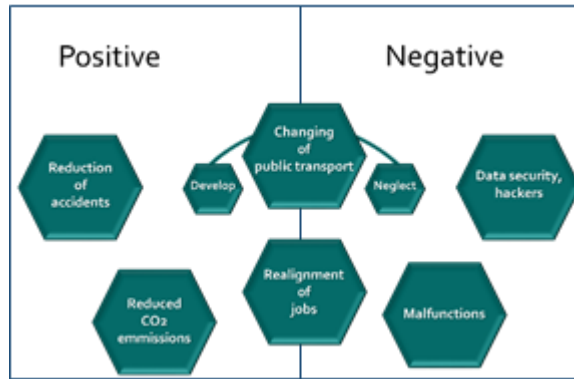
Figure 2 Changing positive and negative factors (Own data)

3 Research results

As the quantitative part of our research we made a questionnaire survey, where besides the issue of social acceptance we dealt with the issue of public opinion of self-driving cars.. The form was available online and we could reach 207 person. 110 male and 97 female. The youngest person was 16 years old and the oldest was 65 years old. In terms of age groups, most of them were from the 20-25 year-old group, thanks to the circle of acquaintances

Table 1 Age groups (Own data)

Age groups (N=207)	
15-24	50,7%
25-34	15,9%
35-44	18,8%
45-54	10,6%
55-64	3,4%
65-74	0,5%

3.1   Trust

Different researches prove that the attitude of accepting innovations in a given country can be considered as a kind of social institution, which also has an impact on economic growth in [12]. At the same time, innovation plays an important role in production and consumption as well [4][5].

We were eager to know what level was considered safe by the majority, so the 6 different automation levels had to be evaluated on a 5-grade scale. For better transparency, we have merged the values into 3 -Safe, Neutral, Unsafe- options.
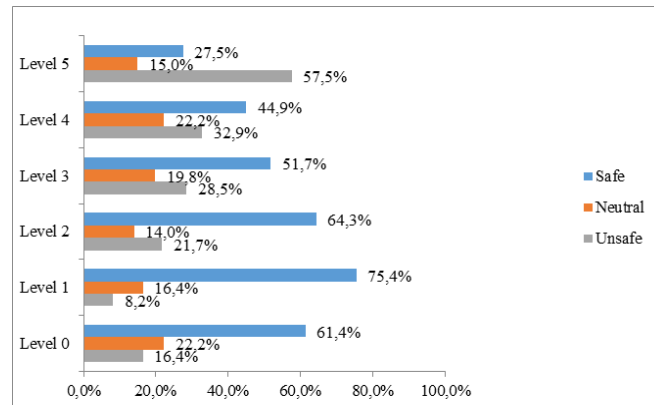
Figure 3 Opinion about safety (Own data)

As the figure shows, levels 0, 1, and 2 are still considered safe by the majority, where there is only some driving support system in the car, only partially automated. For Levels 3, 4, where the car may in some cases take control, the number of people who do not consider it safe is starting to grow. The fifth level is even more outstanding as it is considered unsafe by 57.5% of the participants.

3.2   Opinion about changes

To find the major concerns of people, we have highlighted some of them and we asked the respondents to indicate their degree. These were the major issues which are in connection with those negative factors that we have introduced previously:

- Hackers get into the car system;
- Malfuntioning;
- Does not decide how we would do;
- Fear of new technology;
- People lose their jobs (eg taxi drivers);
- Loss of control;
- High price;
- Loss of driving experience;
- Lack of personal data security.

They could evaluate each of them from 1 to 5 (1 = lowest, 5 = highest), depending on the degree of concern in each case. In most places, level 5 was the source of concern, from the highest -the primary concern is the loss of the driving experience (90 people); then malfunctioning (83 persons); hackers get into the system (77 people); loss of control (76 people); it does not decide how we want (65 people). Except for driving experience, outstanding results can be linked to security issues. Of course, these are not the only factors of fear, the basis for questioning was the most commonly occurring concerns in international researches [11].

Conclusions

The introduction of self-driving cars can bring many benefits, but it requires the right background and a target group to accommodate it. We believe that the society, or at least Hungary, is not yet ready for this development. Nearly half of the respondents in our questionnaire belong to the age group below 24, which will later be the potential customer circle[2][3].

As it turned out from international research and from our own survey, people are distrustful of the new technology [7][8][9] Positive effects, which will almost certainly come with the introduction of autonomous vehicles, are not believed by people. In addition, most of the concerns that are being investigated are a real problem for the majority, especially security issues. These concerns could be reduced by sharing information (eg, education) if automakers find a solution. I believe that the emphasis should not only be placed on cars, but also on public transport vehicles, as they can not be left out with the appearance of self-driving cars.

Acknowledgement

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Reasons for carbon-free resources and viewing conventional energy supply on the results of a research

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The consequences of climate change are among the greatest challenges of the 21st century. The global average temperature will rise by more than 2.5 C, which will increase the number of starving people by over 80 million. 25% of mammal species and 12% of bird species are projected to be extinct. The Earth's population is currently over 7.5 billion people, growing steadily. It also means a steady increase in the energy demand of the population. The greenhouse effect, which causes global warming, is primarily responsible for climate change. According to a NASA report, the rate of warming is faster than that of any previous modeling, so the greenhouse gas emissions must be drastically reduced to slow down the process. Each year, 6 billion tonnes of CO_2 emissions come from fossil fuel emissions and 1 billion tonnes from land use. According to the University of California, CO_2 emissions are distributed as follows: transport 49%, electricity generation 30%, industry 11%, population 7%, trade 3%. The aim of the study is to present the knowledge and opinion of the respondents about the classification of conventional energy sources and how long the Hungarian carbon / lignite stock may be sufficient.

Keywords: traditional, energy sources, coal, lignite, stock.

1 Literature review

The consequences of climate change are among the greatest challenges of the 21st century.

The global average temperature will rise by more than 2.5 C, which will increase the number of starving people by over 80 million. 25% of mammal species and 12% of bird species are projected to be extinct. The Earth's population is currently over 7.5 billion people, growing steadily.

It also means a steady increase in the energy demand of the population. The greenhouse effect, which causes global warming, is primarily responsible for climate change. According to a NASA report, the rate of warming is faster than

that of any previous modeling, so the greenhouse gas emissions must be drastically reduced to slow down the process. Each year, 6 billion tonnes of CO_2 emissions come from fossil fuel emissions and 1 billion tonnes from land use. As a result of global warming, natural disasters such as forest fires, floods, rising sea levels, hurricanes and hot waves are becoming more common. The heat wave of the summer of 2003 caused 35,000 death. Due to the low water level of the rivers, the power plants will not get enough cooling water, so energy shortages are expected. According to the University of California, CO_2 emissions are distributed as follows: transport 49%, electricity generation 30%, industry 11%, population 7%, trade 3%. The way to reduce emissions from electricity generation is through renewable and nuclear-based carbon-free production. Without a carbon emission, a nuclear power plant can only perform the task of a basic power plant. Renewables are not able to take over the role of basic power plants, however, by integrating appropriate storage facilities into the system, decentralized scheduling and peak control capacities can be provided alongside the base-load generation nuclear power plant units [9].

Progress is being made to ensure that the needs of the present population are met so that this option can be maintained for future generations (Brundtland Commission of the United Nations, 1987). China is already the most fossil energy user society in the world today. By 2035, double as much coal will be used to generate electricity, as the OECD's most economically advanced countries in the world. China alone will use twice as much coal to generate electricity as OECD countries together in 2035 [15].

From 2030 onwards, fossil energy sources (including hydrocarbons, coal and lignite) can only be exploited with Carbon Capture and Storage (CCS) and clean coal technologies. Without this, decarbonisation plans will not be implemented. If the environmental externalities of energy production are also included in the prices, fossil fuels could be a major competitive disadvantage for nuclear and renewable energy. The share of renewable energy will still be eligible for funding. The benefits of nuclear power are low greenhouse gas (GHG) emissions, low electricity production prices, raw materials without political and economic risk. Its disadvantages are the high investment demand, which in the case of private sector investment also requires budget coverage (budget deficit increasing item) and high environmental risks of a possible malfunction. In the case of power plant gas demand, which increases many times in the long term without the use of nuclear energy, it is a disadvantage of source-vulnerability, high oil-related purchase price, and high greenhouse gas emissions compared to nuclear energy.

The advantageous features of the natural gas are that its disadvantageous properties can be improved by the emergence of non-conventional gas on the world market, the price can be reduced and CCS technology can also significantly reduce GHG emissions. The prerequisite for this scenario is, of course, the marketability of CCS technology. The scenario dominated by natural gas and / or nuclear energy is also likely to be due to the limited share of renewable energy

sources (economic and technical maximum), even if the exploitation of renewable energy sources is partly competitive on a market basis. [11]. The exploitation of renewable resources is a major challenge for the millennium, and the financing side also places great emphasis on it [5][6]. The future situation of third world countries poses other problems than developed countries. The energy challenge of rapid development and related carbon emissions is the biggest challenge [1].

Nuclear energy, as the energy from the fission process, is the subject of debate in the energy sector. Nuclear power plants produce CO_2 free of charge, and the provision of radioactive waste at the end of the process must be ensured. Safe operation is also a basic requirement, as a serious malfunction can cause destructive radiation to the environment. Nuclear power plants have evolved from the military industry in the middle of the twentieth century and to this day, significant progress has been made. In 2013, 11% of the world's electricity production was produced [3].

There should be professional discussions about the positive and negative effects on the environment and the experiences of the accidents that have occurred so far. An important task is the management and storage of low, medium, high grade nuclear waste. This includes geological placement, reprocessing of spent fuel pastilles, and conversion of radioactive isotopes into stable or short-lived materials. An important task is the development of fission reactors (third and fourth generation reactors) and fusion reactors [9].

The goal is to create diverse agriculture, environmental and landscape management that produces healthy and safe foods, as well as local energies and various raw materials, while preserving our soil, our drinking water resources, our wildlife, our natural values [11].

A nation state is energy safe, where energy carriers and services are available to such an extentto ensure the nation's survival, the protection of well-being, and the minimization of risks arising from care and use [7].

The installed capacity of the Hungarian electricity system is constantly decreasing due to the power plant units lost by aging. Until 2020, 3300MW will be closed and another 660MW will be closed by 2025 [12]. According to MAVIR's short-term, medium- and long-term resource side balance sheet analysis of the electricity system, by 2025 an annual peak demand of 8,000 MW should be calculated [10]. The continent's nuclear, coal and gas plants together, use 4.5 billion cubic meters of water annually. This is the annual water demand of 82 million EU citizens, roughly the same as Germany. 44 percent of the EU's total water use is attributable to the energy industry [14].

The energy carriers created by decomposition of air from plant and animal residues are fossil (fossil) energy carriers that have evolved over millions of years. They are solid, liquid or gaseous, have high energy density, have mainly carbon and hydrogen compounds. These are non-renewable energy sources. What had to

be accumulated for millions of humanity deplete in a few hundred years. Essential fossil fuels are coal, oil, petroleum products and natural gas [8].

Intensive energy utilization of communal waste began to develop in the 1990s, in Western Europe. As a result of technological advances, the problem of waste management has become increasingly important. There were various alternatives to the treatment of the waste generated, the priorities of which are the waste hierarchy. Energy use is at a higher level than landfill, but less good than recycling. So it is advisable to burn non-recoverable waste in the power plants. The thermal utilization of waste is also favored by cement plants.

2 Methodological background

Quantitative research was a national survey conducted between 23 October 2018 and 02 January 2019. Before finalizing the questionnaire I made a pre-test. The questionnaire contained closed questions, according to which the respondents were able to choose the answer options in the standardized questionnaire. This method makes the assessment clearer and easier. I have tried to formulate the questions so as not to weaken the respondents' willingness to respond. I was especially concerned that the questions and possible answers did not violate the rights of the personality and the potential sensitivity of the respondents. I have been looking for answers to questions about the knowledge of energy sources that have not yet been the subject of a national survey of this kind and provide the researcher with information about the learned or experiential knowledge of the respondents. I tried to involve the population as widely as possible in the education and age distribution. I sent this questionnaire for more than 200 people. The online questionnaire was filled by 183 people. All 183 completed questionnaires were regular and evaluable. Data Processing was made by SPSS (Statistical Package for Social Sciences) 19. and Microsoft Office Excel 2007 software. The results in this study are presented using cross-table analysis.

Of the 183 respondents, 139 were male and 44 female respondents. The age distribution of respondents is shown in the table below.

Table 1: Distribution of respondents by age

Date of birth	Person
Before 1946	2
1946-1964	47
1965-1980	54
1981-1999	76
After 2000	4

Source: own research, 2019, N = 183

The table shows that the vast majority of respondents are citizens born between 1946 and 1999. The activity of the respondents born between 1981 and 1999 also stands out significantly from this set.

3 Results

With the first question in the questionnaire, I wanted to know what the respondents considered as the conventional source of energy by looked at the respondents' age. Looking at the answer options, analyzing the SPSS software with cross-table function, I got the following results.

Table 2: Carbon as a traditional energy source

Age	Before 1946	1946-1964	1965-1980	1981-1999	After 2000	All
Person	1	43	51	71	3	169
Ratio of the carbon markers	0,6%	25,4%	30,2%	42,0%	1,8%	100,0%
Age distribution	50,0%	91,5%	94,4%	93,4%	75,0%	92,3%
Distribution across all respondents	0,5%	23,5%	27,9%	38,8%	1,6%	92,3%

Source: own research, 2019, N = 183

On the basis of the results obtained, it can be stated that the vast majority of respondents, more than 90% of people born between 1946 and 1999 consider coal as a traditional source of energy. The highest proportion was from 94.4% of the 1965-1980 age group.

Table 3: Lignite as a conventional energy source

Age	Before 1946	1946-1964	1965-1980	1981-1999	After 2000	All
Person	1	36	42	43	1	123
Ratio of the lignite markers	0,8%	29,3%	34,1%	35,0%	0,8%	100,0%
Age distribution	50,0%	76,6%	77,8%	56,6%	25,0%	67,2%
Distribution across all respondents	0,5%	19,7%	23,0%	23,5%	0,5%	67,2%

Source: own research, 2019, N = 183

On the basis of the results obtained, it can be seen that the respondents considered the majority of people born between 1946 and 1999 to be lignite as a conventional source of energy, but at a much lower rate than coal. In addition, it can be observed that the majority of people born between 1946 and 1980 think of lignite as a conventional source of energy between 76.6% and 77.8%, so the uncertainty of younger respondents is 56.6%.

Table 4: Natural gas as a traditional energy source

Age	Before 1946	1946-1964	1965-1980	1981-1999	After 2000	All
Person	1	38	48	55	3	145
Ratio of the natural gas markers	0,7%	26,2%	33,1%	37,9%	2,1%	100,0%
Age distribution	50,0%	80,9%	88,9%	72,4%	75,0%	79,2%
Distribution across all respondents	0,5%	20,8%	26,2%	30,1%	1,6%	79,2%

Source: own research, 2019, N = 183

Based on the results obtained, the assessment of natural gas as a traditional energy source for the most active three age groups is once again showing a strong majority with the 88.9% outstanding value of the 1965-1980 age group, however, there were some uncertainty about the responses was born in 1981.

Table 5: Wood as a traditional energy source

Age	Before 1946	1946-1964	1965-1980	1981-1999	After 2000	All
Person	0	30	40	49	3	122
Ratio of the wood markers	0,0%	24,6%	32,8%	40,2%	2,5%	100,0%
Age distribution	0,0%	63,8%	74,1%	64,5%	75,0%	66,7%
Distribution across all respondents	0,0%	16,4%	21,9%	26,8%	1,6%	66,7%

Source: own research, 2019, N = 183

The perception of wood as a traditional energy source also enjoys a majority, but to a lesser extent than the previous three energy sources. In this case, respondents born between 1965 and 1980 proved to be more determined by 74.1% compared to other age groups.

Table 6: Straw as a traditional energy source

Age	Before 1946	1946-1964	1965-1980	1981-1999	After 2000	All
Person	0	18	14	14	0	46
Ratio of the straw markers	0,0%	39,1%	30,4%	30,4%	0,0%	100,0%
Age distribution	0,0%	38,3%	25,9%	18,4%	0,0%	25,1%
Distribution across all respondents	0,0%	9,8%	7,7%	7,7%	0,0%	25,1%

Source: own research, 2019, N = 183

The classification of straw as a conventional energy source has a strong uncertainty for all ages. In the highest proportion, 38.3%, the generation born between 1946 and 1964 thinks straw is a traditional fuel, but most do not accept it.

Table 7: Waste as a traditional energy source

Age	Before 1946	1946-1964	1965-1980	1981-1999	After 2000	All
Person	1	13	13	7	0	34
Ratio of the waste markers	2,9%	38,2%	38,2%	20,6%	0,0%	100,0%
Age distribution	50,0%	27,7%	24,1%	9,2%	0,0%	18,6%
Distribution across all respondents	0,5%	7,1%	7,1%	3,8%	0,0%	18,6%

Source: own research, 2019, N = 183

Waste is considered the least conventional source of energy by the respondents. According to the survey, 9.2% of respondents born between 1981 and 1999 said waste was a traditional energy source. The highest votes was 27.7% of the generation between 1946 and 1964.

With the second question in the questionnaire, I wanted to know that, according to the respondents, choosing from the given answer options, how long can the Hungarian carbon / lignite stock be enough, tested by age of respondents?

Table 8: Sufficient carbon / lignite stock for 0-50 years according to respondents

Age	Before 1946	1946-1964	1965-1980	1981-1999	After 2000	All
Person	1	18	23	44	1	87
Ratio of the 0-50 years markers	1,1%	20,7%	26,4%	50,6%	1,1%	100,0%
Age distribution	50,0%	38,3%	42,6%	57,9%	25,0%	47,5%
Distribution across all respondents	0,5%	9,8%	12,6%	24,0%	0,5%	47,5%

Source: own research, 2019, N = 183

Of the total of 183 respondents, 87, 47.5% of respondents thought that the carbon stock would run out in 50 years. In this 50.6% response, those born between 1981 and 1999 proved to be the most determined. This is a 24.0% ratio between all respondents (183 people).

Table 9: Carbon / lignite stock for 50-100 years according to respondents

Age	Before 1946	1946-1964	1965-1980	1981-1999	After 2000	All
Person	0	19	24	27	3	73
Ratio of the 50-100 years markers	0,0%	26,0%	32,9%	37,0%	4,1%	100,0%
Age distribution	0,0%	40,4%	44,4%	35,5%	75,0%	39,9%
Distribution across all respondents	0,0%	10,4%	13,1%	14,8%	1,6%	39,9%

Source: own research, 2019, N = 183

A total of 73, 39.9% of the respondents said that we still have enough carbon for up to 100 years or at least 50 years. In this issue, the majority of the respondents were born between 1981 and 1999, with a ratio of 37.0%. This is a 14.8% ratio between all respondents (183 people).

Table 10: Sufficient carbon / lignite stock for over 100 years according to respondents

Age	Before 1946	1946-1964	1965-1980	1981-1999	After 2000	All
Person	1	10	7	5	0	23
Ratio of the more than 100 years markers	4,3%	43,5%	30,4%	21,7%	0,0%	100,0%
Age distribution	50,0%	21,3%	13,0%	6,6%	0,0%	12,6%
Distribution across all respondents	0,5%	5,5%	3,8%	2,7%	0,0%	12,6%

Source: own research, 2019, N = 183

Only 23 out of 12.6% of all respondents said we still had at least 100 years of carbon stock in Hungary. In this group, respondents born between 1946 and 1964 proved to be the most optimistic with 5.5% of all respondents (183).

4 Conclusion

It can be seen from the above that the highest number of questionnaires sent by respondents born between 1981 to 1999 sent answers. However, when evaluating the responses, it can be stated that while all three age groups that could be considered were strong in the judgment of coal as a traditional energy carrier, there was different understanding of the other options. It is worth noting that lignite is less known as a conventional energy source than coal. In contrast, wood has been classified by many as 122 traditional fuel, although it is the most widely used renewable energy source. Some literature also identifies nuclear energy as a conventional energy source. The energy industry also has different opinions, so I did not make it difficult for the respondents to choose uranium. The overwhelming majority of respondents, 160 people think in the assessment of the Hungarian carbon stock is enough up to 100 years. The majority, 87 people believe that we cannot think over the availability of hungarian coal for more than 50 years.

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Future of the Robotic Process Automation

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Abstract: Robotic Process Automation is the technology that allows anyone today to configure computer software, or a "robot" to emulate and integrate the actions of a human interacting within digital systems to execute a business process. RPA robots utilize the user interface to capture data and manipulate applications just like humans do. They interpret, trigger responses and communicate with other systems in order to perform on a vast variety of repetitive tasks. My presentation gathers and analyze the future of RPA and summarize expectation behind this technology.

Keywords: RPA, software robot, automation, roadmap, process management

1 Background of the topic

According to J.W. Middelburg one of the biggest worldwide influencers in RPA topic, the automation is a system that functions without direct human interactions. Based on his international research many automated systems have this in common: taking out the most unreliable factor (human error) thus improving precision, quality, and accuracy. The first thesis of how to automate processes using software came in 1935, when the scientist Alan Turing described how a systematical algorithm could work processes more effectively and help to speed up and achieved best quality of companies' processes. His ideas on algorithms and automation had a lasting impact [1].

First development began at MIT in 1964 when the first laboratories researching artificial intelligence (AI) has been opened by scientists and following, in 1965 the first Robotics Institute was opened [2]. As far as Middelburg professional opinion is concerned Service Automation has been defined as the next wave of development in automation. Middleburg described service automation as a part of information technology that is used to automate services and deliver optimal user experience. Willcocks & Lacity from MIT defined RPA as service automation, but other terms also apply to service automation. For example, a scripting tool, artificial intelligence, cognitive computing, BPM, etc.

Robotic Process Automation is defined by the IEEE Standards Association as:

"A preconfigured software instance that uses business rules and predefined activity choreography to complete the autonomous execution of a combination of processes, activities, transactions, and tasks in one or more unrelated software systems to deliver a result or service with human exception management" [3]

The term of Robotic Process Automation (RPA) has been used first at the beginning of 21st century and was created by marketing director Patric Geary from Blue Prism, one of the RPA companies on global worked. RPA is a newly developed technology and there is no proper research from the early stages of use. RPA market increased popularity between 2014 and 2015 when relevant companies started to announce considerable savings due to automation. The market for RPA back-office automation was becoming more significant by early 2016, but it was still relatively small-scale during this time. The topicality of the topic is also given by the fact that the different generations present in the labor market show similarities in some things. For example, they are open to IT solutions and creative ideas. [4]

2 Robotic Process Automation in nutshell

After short introduction of Robotic Process Automation (RPA) there should be a conclusion that it is mostly a methodology where a software is using complete specific process that was previously done by a human. Lot of RPA scientits and influencers can confirm that Robotic automation software will not replace systems. Due to this aspect, it works with the system and manages a particular task maybe paralelly in the same way as it has been asked to complete [5]. RPA interacts with a computer system the same way a human would, but much faster and at a lower cost, it is the ROI of RPA implementation. Instead of using a salary-paid employee (FTE or PTE) to do a repetitive task on the computer, RPA can be used to do the processes that includes the typing and clicking the same way as a human [6]. RPA does not require changing old ERP systems with their all components. RPA can be integrated with any software used by humans and it can be implemented in a short period of time for the purpose of carrying out operational procedures [7]. According to a BIG4 company' survey the decision makers answers indicated that cost reduction was the main priority when implementing RPA. However, there should be a noticeable shift in the aspiration for robotics. During studies they have been asked about their automation strategy in our latest research, and the top three priorities for executives were to increase productivity, improve customer experience and deliver automation at significant scale. As far as I am concerned and this is the output of study that value of RPA in terms of productivity rather than labour displacement shows a maturing of many

organisations' automation strategies. However, productivity is only one measure of the value of work done by digital workers, but let's check real figures [8].
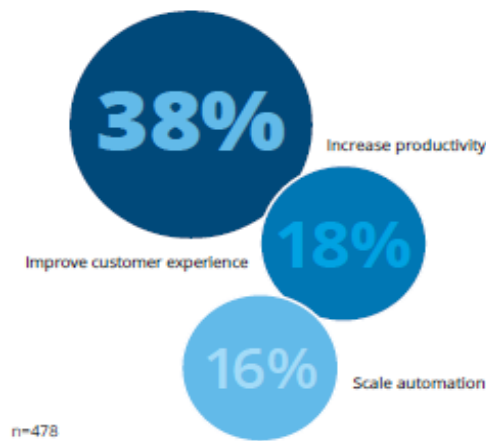
Figure 1 Top three priorities for organizations' automation strategies

3 Future prospects and challenges of RPA

Based on Forrester reasearch the robotic process automation (RPA) market is heated — but to be sustained, RPA must offer more than plugging gaps in legacy systems. Based on forecast spending on RPA solutions based on the projected reduction in cubicle jobs due to artificial intelligence (AI) and related technology. Forrester found that the RPA market, while only $250 million in 2016, will grow to $2.9 billion in 2021 [9]. Adding AI to RPA will free it from an exclusive focus on rote tasks. AI will account for an increasing portion of the digital workforce, and in the end, RPA will be a small fraction of the overall AI "cubicle" market spend. Of course it's a very impressive number and the competition has already started among RPA market members. It should cause a confusion by customers. As all of IT projects RPA implementations also include risk and clients are in an uncertain situation. Based on previous research, there are key barriers to implement RPA solutions on global market. If we check next Figure there are three main limitation behind such projects. The most obvious and challenging barrier is cited as process fragmentation, typically caused by multiple process and system variations and resulting in increased complexity and reduced leverage from individual automations. Most obviously, this is identified during discovery activities and results in automation opportunity pipelines including a very high number of very low value opportunities. A mean opportunity value of $50,000 per task automation is quite common, setting a low bar for implementation costs.

During RPA interviews the consultants and the experts frequently surprised at how many organisations have yet to define a vision and ambition for automation. Without this, it is not clear how automation teams will secure the funding to build the skills, capability and capacity required to automate at scale. At its simplest, being able to articulate how many bots will be implemented over the next year, and where and why these will be deployed, is surely essential to securing investment from senior management. This is the lack of clear vision what is also important category in everywhere.

IT teams are only just beginning to fully appreciate how different the deployment of automation technologies is to traditional IT systems, how profound the changes they will introduce are, and the potential impact on the role of IT teams. As medium omplexity robot implementation schedules ranging from 4 weeks up to 24 weeks. Needless to say, at the upper end of that range automation becomes non-viable economically. As IT teams learn and adapt to the changes required to implement automation technologies successfully, as the pace of robot deployment accelerates rapidly.
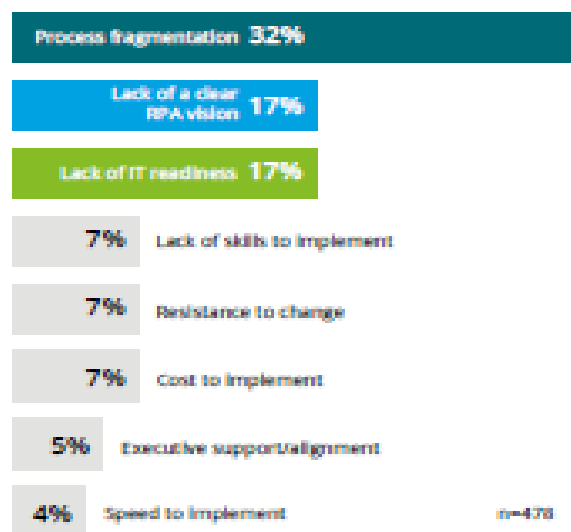
Figure 2 Biggest barriers to scaling RPA, percentage of respondents

Conclusions

According to gathered seconder information, we are at the beginning of RPA hype, which means there is a huge possibility for process automation companies and the end users also. In order to increase the number of successful implementations, companies need a good infrastructure to set their team up for success, well-trained project team members, who are not afraid of raising and resolving issues in a really short period of time by gathering really deep business

understanding, and an exhaustive plan on the solution, so your team won't need to improvise right from the start of the development.

When we discuss further improvement of this area, we need to find the point and main KPI of a RPA project. Last but not least with RPA there are four key messages for those companies who are willingness to invest into a robotic software. Firstly, they must to start with a foundation where they can build globally at an Enterprise level. Secondly, to ensure all of the stakeholder's involvement very early in the process, and ensure security, audit, governance, control, and IT oversight are covered processes also. Based on surveys it will not slow down the ultimate adoption of the applications. It will not cost money but it means that if all the stakeholders are involved early on and the roadmap to success is drawn up based on these stakeholders' involvement, then the organization is going to be able to build a much more solid foundation and a solid business offering underpinned by resilient IT. Thirdly, do not be tempted by quick wins, or service level or departmental solutions. This is something that needs to start as an Enterprise rollout. Even if it does not, in the end, become an Enterprise rollout, you have to begin with that concept. Fourthly, if you do these three things, you can build around the RPA, for example at the front end for unstructured data, and later for insight through business analytics. [10].

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Competencies by Learning and Development- A key to Performance Management

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Abstract: Organizations are a combination of human and technology. Empowering human skills with technical systems lead to achieve real growth to the organizations. Human Resource Development is in a constant state of development, responding to organizational and environmental change. It is a powerful device to endow individuals, organizations and societies to compete effectively in a global market place. A study on Performance Management encourages employees to achieve optimum level of work performance in align with the organizational goals. This research not only helps to explore the relationship between PM in a Public and a Private organization, but it facilitates a framework to develop employee morale by learning and development. In this context, it is vital to depict the outcomes of two independent variables viz. competencies, and learning and development towards its dependent variable, PM. It highlights on the employee perception about PM practices of the two companies, which is a fundamental factor for attracting, retaining, and motivating employees. Accordingly, the study is concentrated at Kochi, Kerala, in the shape of "Competencies by Learning and Development- A key to Performance Management," with a focus on the Plant level workers and the Managerial staff consists of sample size 481 and 475 respectively. Furthermore, it has been statistically verified that two factors show a positive relationship with PM. Along with this, it identifies the extent to which the PM and its work-life factors are provided by the selected companies. The outcome of the survey generated relationship between dependent variable (PM) and independent variables (work-life factors), different opinion in their PM processes, their outlook about PM practices and work-life factors with respect to demographic factors, personal satisfaction about their PM methods, varying satisfaction level with respect to the demographic factors, and the influence of work-life variables in the selected companies.

Keywords: Competencies, learning and Development, Performance Management

1 Introduction

Every business must be prepared to deal with the global economy. Organizations in this 21st century face a lot of challenges to survive in the global market. One of the challenging factors is the management of human assets because these cannot

be substituted with any other assets. If organizations provide a constructive platform to develop their full potentials in life and work, there is no need to replace with any other alternatives for the success and survivability of organizations. People should enjoy their work-life in order to get maximum output. Human resource development performs an imperative role in improving employee performance. It focuses on the central goal of developing human potential in every aspect of all-time learning. A focus on the organizational goals along with personal goals by systematic expansion of peoples' work-related abilities must be the need of the hour.

Businesses of all sizes benefit when HRM operates with a competency framework. Competitiveness refers to a company's ability to maintain and gain market share in an industry. Competencies for performance managers are in various ways. These organizational designers should have a mastery over contemporary human resource tasks such as acquiring, training, and compensation employees. Talent managers are always culture and change stewards which mean they are capable of creating HR practices that support the firm's cultural values. Managers must be strategy architects with the skills to help in establishing the company's overall strategic plan and to put in place the human resource development practices required to accomplishing that plan. As operational executors, they are capable to anticipate, draft, and implement above practices. The departmental (finance, sales, production) goals can be achieved by helping functional and general managers in business allies by applying business knowledge. A wide outlook on competencies creates credible campaigners with skills in leadership, respectful, admirable, listening and proactive in taking challenges.

Training in organizations is a planned effort by a company to facilitate learning of job-related competencies, knowledge, skills, and behaviors for employees. Its goal is to master them with these competencies and allow them to apply in their day-to-day activities. Moreover, development includes training as well as formal education, job experiences, relationship and assessments of personality, skills, and abilities that help employees prepare for future job or positions. It is a continuous and never-ending process.

Performance management process represents three steps; goal-setting/appraisal/feedback. It is the constant process of identifying, measuring, and developing the performance of individuals and teams and aligning their performance with the organizational goals.

The selected Universe for the study is highly reinforced with talented and skilled professionals, good infrastructure, economic viability and expatriate remittances. So, this study will be an eye-opener for young professionals, entrepreneurs and corporates and for industrial sectors. Data reveals that there is more migration of skilled labors from Kerala, India to Middle East and Western countries such as US, UK and Europe.

In the light of above background, this study could definitely throw light on the PM practices with respect to competencies and Learning and development in Public and Private organizations. It highlights on the employee perceptions on these factors and thus companies can develop these factors for its effectiveness. Furthermore, it has been statistically verified that this personal satisfaction towards their work-life can bridge the gap towards organizational and personal goals.

2 Literature Review

Globalization and industrialization force companies to expand into new markets not only due to enormous demands of consumers but to produce their products and services in areas with less production costs. This resulted in more job opportunities in developing countries which can reduce unemployment.

Migration, both internal and international has become progressively important policy question both in developed and developing countries. Kerala state always witnesses high level of migration. The Kerala Migration Survey-2016, conducted by Centre for Development Studies shows an absolute decline in the total number of Kerala emigrants abroad from 2.4 million in 2014 to 2.24 million in 2016, constituting a drop of 1.54 lakh. It is for the first time the number has declined since CDS started conducting migration surveys in 1998. The people in the migration prone-age group of 20-30 years have declined significantly in the state. While 42% of total population of the state in 1960 were in the age group of 0-14 years, it has dropped to just 23% in the 2011 census, another reason is the steady decline in the wage differential between Kerala and Gulf, especially to blue-collar jobs. The survey however shows that Gulf region continues to be the favorite destination of migrants from the State with 89.1% of emigrants live in the GCC countries. Among the non-Gulf countries, USA had the most number of emigrants (4.2%) followed by UK (1.6%). Significantly, the study has also for the first time in the last two decades show decline in remittance flow to the state from Rs. 71,142 crore (10,163.14 million USD)in 2014 to Rs. 63.289 crore (9.041 million USD) in 2016. NRKs' in the Gulf have been facing a series of setbacks in recent years in the form of growing nationalization, rising costs of living and uncertainties caused by geopolitical shifts.

Owing to these reasons, this study has a lot of scope for improving the infrastructure and working conditions of present industries in the state and to attract and retain the work force. The study utilized two models for profound understanding of Performance management systems in selected companies. Goal setting theory by Edward Locke (1984) and Expectancy theory by Victor Vroom (1964) form the basis for theoretical aspects. Locke's primary revelation was around the power of setting specific and measurable goals, rather than keeping

outcomes general. Employees can be motivated with these above factors along with a proper feedback. Vroom suggests that an employee's beliefs about Expectancy, Instrumentality, and Valence interact psychologically to create a motivational force so that the employee can enjoy and avoid pain.

Elangovan and Karakowsky (1999) argue that organizations gain from training programs through the improved performance and increased productivity that accompany employee development, while employees enjoy intrinsic and extrinsic rewards associated with skill development and performance improvement. An examination of the dimensions of commonly used training interventions highlighted on; Lectures, role plays, group discussions, workshops, case studies, projects, distance learning including e-learning learning logs, mentoring/apprenticeship, outward bound trainings.

As an expensive investment in an employee's future, organizations are constantly seeking to improve on the effectiveness and return on their investment (Cheng and Ho, 2001). Consequently much attention has been devoted towards optimizing training design and facilitating greater transfer of training back to the workplace (Holton and Bates, 2000). For the last two decades, competency frameworks have been employed as an effective means of structuring development processes within organizations. As Hafeez and Essmail (2007) point out, competences refer to the activities that an organization must excel at to outperform competitors, whereas competencies relate to individual knowledge, skills and attributes necessary to carry out a function effectively.

Nowadays, management began to recognize the importance of human resources in face of increased competition. McLagan (1989) maintains that HRD involves training and development, organization development and career development. Accordingly, HRD is focused on the three elements that contribute to individual performance improvement.

Figure 1 McLagan, P. (1989) Models for HRD Practise, Alexandria, VA: ASTD Press.

3 Methodology

Based on the literature survey about Human Resource Development in organizations, a framework for research questions has been designed. Accompanied by the information gathered from secondary data, it is decided to focus the study on the subjective aspects about the Performance management factors of employees in public and private organizations. Those experience highlights on the inner desires, beliefs, motives, skills from employee perspective. It is imperative to measure these factors through statistically. Hence, the study is a combination of quantitative and qualitative forms of inquiry. The objectives for the study are;

• To understand the importance of PM in a Public and a Private organization

• To identify the employee perception about PM and its related variables

• To categorize the difference in the perception about PM in Public and Private organizations with respect to demographic factors

• To pinpoint the satisfaction level of employees related to variables with respect to demographic factors.

A pilot study has been conducted to test the reliability of the research questions and methods to be adopted. Based on this, the questionnaire was further refined and utilized for data collection. It was a self-developed with Likert point of scale. Demographic factors forms the first part followed by independent variables and related sub-variables. As a final part, satisfaction level of employees was also mentioned. An appropriate survey helped to get data from a large sample of population from different industries. Universe consists of the selected employees from Public and Private Companies. As it was a stratified proportional sampling method, quantitative (survey) and qualitative (interview/interaction) data were collected from both managerial and plant level workers (blue-collars) from two companies as a cross sectional study. Thus, the sample size consists of 481 from Public sector and from 475 Private sector.

Table 1 Sample Profile

	Company	POSITION		TOTAL
		Administration	Plant	
1	Public	313 (65.1%)	168 (34.9%)	481
2	Private	148 (31.2%)	327 (68.8%)	475
	Total	461	495	

Table 2; Variables and Measures

Sl. #	Variables	Sub variables
1.	Competencies	Promotion policies and its implementation
		Design of the Job/Challenging
		Job description aligned to organizational goals
		Professionalism among supervisors/superiors
		Technological advancement
		Work-life balance and achievement of personal goals
		Reward system
		Salary benefits
2.	Learning and Development	Updating the technology
		Soft skill training
		Feeling of competency
		Improvements in academic field
		Awareness in health and safety measures
		Job rotation
		Stress management
		Job enrichment activities

The edited questionnaires were then undergone for coding of the responses i.e. for demographic factors, and for each point of scale. The responses were then keyed to SPSS. After that, Mean, Standard deviation, percentage and frequencies were first calculated to get the initial response to each item in the questionnaire. Thus, all items were analyzed using descriptive statistics. One sample Z-test was used to investigate the level of Performance management. Along with this, an independent Z test helped to find significant variation in the responses between two companies. In order to find any difference in responses due to demographic factors, ANOVA test has been utilized. Moreover, Chi square test has applied to find the dependency of personal satisfaction level with the demographic factors.

Reliability of the scale was measured by Cronbach's alpha. The major approaches done in the study for scale refinement and validation are Exploratory factor analysis (EFA) and Confirmatory factor analysis (CFA). The EFA was done by SPSS-17.

3.1 Limitations of the survey

The researcher was not allowed to collect the information directly from all the plant level workers due to the strict safety norms in manufacturing area. The questionnaire was submitted to the administrative office and the respective officers collect the information for the researcher.

4 Data Analysis

This part of the study deals with comparative investigation of work-life dimensions of the Public sector and the Private sector Companies. The statistical analysis comprises two stages; the first stage is the descriptive statistics of the measurement items and the second part tested the proposed research model which examined the importance and influences of the manifest variable's path coefficient.

Table 3; Analysis of Socio-environmental Character of Respondents

Factors	FACT	ATL
Gender		
Male	333 (69.2%)	460 (96.8%)
Female	148 (30.8%)	15(3.2%)
Age		
20-30	30(6.2%)	75(15.8%)
31-40	37(7.7%)	151(31.8%)
41-50	231(48%)	204(42.9%)
Above 50	183(38%)	45(9.5%)
Qualification		
Professional	132(27.4%)	64(13.5%)
Post Graduate	82(17%)	69(14.5%)
Degree	96(20%)	15(3.2%)
Diploma	99(26%)	42(8.8%)
Pre-degree	51(10.6%)	150(31.6%)
High school level	21(4.4%)	135(28.4%)
Experience		
3-10	36(7.5%)	84(17.7%)
11-15	30(6.2%)	112(23.6%)
16-20	49(10.2%)	69(14.5%)
21-25	205(42.6)	99(20.8%)
Above 25 years	161(33.5%)	111(23.4%)
Living background		
Panchayat	172(35.8%)	233(49.1%)
Municipality	246(51.1%)	242(50.9)
Corporation	63(13.1%)	0

Table 4; EFA Model Fit

Variables	No. of Variables	Kaiser-Meyer-Olkin Measure of Sampling Adequacy	Bartlett's Test of Sphericity -Chi	Df	Sig.
Learning and Development	8	0.813	2050.088	28	<0.001
Competencies	8	0.891	8552.89	300	<0.001

Exploratory factor analysis proved the suitability of work-life variables in each mentioned independent variables using principal component analysis in SPPS. The KMO value for all the two variables found to be exceeded the recommended value of 0.6 and the Bartlett's Test of Sphericity has reached statistical significance, which supports the factorability of the correlation matrix.

Table 5; Descriptive Statistics for Hypotheses test

Variables	Mean	Standard Deviation	Maximum score	Mean % Score	CV
Learning and Development	16.67	3.51	32	52.08	21.07
Competency	19.32	3.87	40	48.30	20.02
Performance Management	35.99	7.38	72	50.19	20.54

Table 6; Performance Management score and its Z test for Public and for Private companies

PM	Mean	Std.Deviation	Maximun score	Mean % Score	CV	Z	P value
Public	206.93	22.18	348	59.46	10.72	-2.047	0.021
Private	191.24	19.20	348	54.95	10.04	-20.163	<0.001

Tabulated value: 1.645

As it is observed from the above table, the MPS of the PM in the Public is 59.46 and that of Private is 54.95, which indicates that the perception of the employees is only moderate as far as the PM in both companies concerned.

In addition, the table above indicates that a comparatively higher work-life environment exists in Public than in Private as the MPS of the respondents from the Public is 59.46 and that of Private is 54.95. To test any significant difference exists among the mean score of the PM among two companies; following are the formulated hypothesis for testing:

H0: The mean score of PM in Public and Private are the same, against the hypothesis

H1: The mean score of PM in Public is greater than that of Private.

Table 7; Comparison of PM score between Public and Private companies

PM	Mean	Mean % Score	CV	Z	P value
Public	206.93	59.46	10.72	11.687	<0.001
Private	191.24	54.95	10.04		

Two sample Z test carried out for testing the above hypothesis has a value of 11.687, which is greater than the tabled value of 1.645. Thus, the test proved that the mean score of PM in Public is greater than that of Private.

A comparison of the PM with respect to socio-environmental factors for each company identifies the relationship of PM with various employees in their gender, position, education, experience, and living background. The two sample Z test shows the significance level in each category. The two sample Z test indicates that there exists a significant difference between the mean of the male and female. PM in Private for the respondents from administrative section is better than that of the Plant employees.

The ANOVA clears that the factor, age, is not significant. So, it states that the age has no significant role in PM in Private. There is significant difference in the age group and PM in both companies. In Public, the result shows that there is not much variation in the outlook of PM with different education levels. This is an influencing factor for PM as far as Private is concerned. In both companies, the F value of the ANOVA test is found to be significant at 1% level, which indicates that there is difference in the mean score of PM with change of work experience. Moreover, the mean score is independent to the place of residence.

Table 8; Comparison of Personal Satisfaction level about PM in Public and in Private

Company		Satisfied	Neutral	Dissatisfied	Highly Dissatisfied
Public	Count	80	187	211	3
	% within the company	16.6%	38.9%	43.9%	6%
Private	Count	146	212	108	9
	% within the company	30.7%	44.6%	22.7%	1.9%
Chi-Square Test	Pearson Chi-Square	Value	df	P value	Conclusion
		57.062	3	<001	Significant

The employees in Private were more satisfied than that of employees from Public as the percentage of the satisfied respondents in Private were about 30.7% and that of Public were about 16.6%. Like this, a comparison of personal satisfaction about PM with socio-environmental factors in both sectors was also tested.

5 Conclusion-Findings and Suggestions

It is evident from the values of MPS and CV from hypotheses test that PM factors and its related work-life factors established the effectiveness of the instrument by confirming the scales of two independent variables and, its positive correlation with all the 16 points by different feelings. Z test and multiple comparison tests clarified the significant difference of diverse groups. All other 16 scales have direct linkage with employee's work-life satisfaction.

Findings from the feelings of respondents about 'Competence,' proved that all factors are consistent with Locke's and Vroom's theory. Though the result showed satisfactory in their PM methods in Private, management should consider the points because ability, job requirements, job content and job context factors can motivate the attitude and character building. This leads to the accomplishment of goals and a balance to work-life.

Z test showed significant values, with P value <.001 for the comparison between PM score and demographic features. Likewise, ANOVA and multiple comparison tests confirmed these variations among gender, position, age, education, experience, and community. In Public, PM score varies with demographic variables except for position, education, and living background. In Private, mean scores of PM fluctuates with all socio-environmental factors. The significance level can be cleared from the values of Two sample Z test, One way ANOVA, Tukey's multiple comparison test. Lack of agreement between expectations and reality would result in conflict and frustration. Identifying any product with their effort and responsibility makes them enthusiastic within the department and management as well. 'Task identity' allow employees to maintain a competency among workers. It affects the attitude towards work as human desires would change with respect to the selected factors and thus the result is consistent with Herzberg's Need theory and motivational theory.

The personal satisfaction with respect to each socio-environmental factor for PM has significant influence in both organizations. Thus, it established the power of independent variables on PM factors. Overall analysis of satisfaction level from both companies showed that more respondents were not much happy in their work-life. In comparative analysis, the employees from Private were more satisfied than the employees from Public, based on the Q: 17. In Public, personal satisfaction level on PM varies with all socio-environmental factors. In Private also, satisfaction level on PM shows inconsistency except for living background. As the research is based also on qualitative analysis, Chi-square test established the significance between two nominal (categorical) variables: satisfaction and company, with a P value of <001, generally and independently. All the above factors related to each other towards employee satisfaction. It can thus be concluded that employee satisfaction level in private sector is more than public sector even though with better work-life factors in public sector.

The outcomes from statistical analysis established the fact that individuals' diverse needs interact with the work environment that shapes on-the job wants, so that employees from both companies call for learning and development. Eventually, these feelings in work-life sub-variables not only helped to understand the influence of each variable in their work-life satisfaction, but also for the accomplishment of their PM variables. The findings achieved by using the developed instrument can assist selected companies to design a job with employee engagement programs to improve or prioritize the work-life factors. In addition, comparison of two work-life variables with demographic factors in FACT and in ATL has facilitated to achieve the objective: interrelationship between two independent variables. It is evident from the findings that which indicator delivers more towards better work-life for different groups. So, logical increase in those particular areas of each indicator can guide to better PM. The results explained the variations with respect to all demographic factors. Thus, the study proved that the employees from both industries were not much satisfied with the present work-life.

Though the result showed satisfactory in their PM elements with respect to dependent variables, management should consider wide range of individual development plans, job postings/job rotations, formal career-oriented performance appraisals, career planning centres, formal counseling and mentoring with managers, succession planning for high-potential employees because ability, job requirements, job content and job context factors can motivate the attitude and character building. This leads to the accomplishment of personal goals and a balance to work-life. The results of the study highlighted that each point could be able to pin-point the areas of weaknesses in qualitative elements of human resources, though surveys are not complete and neutral information-gathering devices. Organizations can prioritize these factors in accord with the values from the findings because the descriptive statistics confirmed that existing work environment needs some improvements in their PM in both companies.

Today owing to recessions, outsourcing, mergers and, downsizing, organizations must be more competitive to survive in the existing economic scenario. In such situations, more work-life factors other than from these two mentioned factors can be identified. Besides, India is powered with skilled and well-educated work force. With greater emphasis laid on HRD aspects the employees today exhibit an attitude of responsibility and performance to the quantitative and qualitative standards. The new generation not only demands a better deal in their work environment, but also keen to fulfill their involvement with the organization. More important, consumer trends and technical innovations are developing rapidly. Thus the study imparts 'the success of any effort at improving quality' must include their employees because, they are not only a major force in carrying out changes, but access their competency and develop their proficiency.

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Socioeconomic picture of Western Hemisphere 10 years after global crisis - Evidence from selected economies

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Abstract: The world economy of the 21st century is characterized by globalization, internationalization and regional economic integration processes. The new era of interconnectedness results in a growing number of international contacts and international business transactions with partners around the globe. Therefore, it is necessary to understand the specific features and characteristics of national economies not only in Europe but also in other continents, including the Western Hemisphere. The main aim of the paper is to identify and assess socioeconomic development of selected Western Hemisphere economies ten years after global financial and economic crisis 2008+. The comparative study embraced the following 12 economies: Argentina, Bolivia, Brazil, Canada, Chile, Colombia, Ecuador, Guatemala, Mexico, Peru, the United States and Venezuela. Moreover, the engagement of the Western Hemisphere economies in both international trade and international transfer of capital in the form of foreign direct investment was studied. Finally, changes in international competitiveness of the selected Western Hemisphere economies between 2008 and 2018 were identified.

Keywords: Western Hemisphere, socioeconomic development, comparative study

1 Introduction

Global crisis of the first decade of the 21st century significantly influenced the world economy: both Eastern Hemisphere and Western Hemisphere were hit by 2008+ crisis. The overall dynamics of phenomena and processes in the globalized economy changed. Some processes were redirected. It seems that even now, ten years after the beginning of the crisis, the world economy and its subjects do remain unstable and the whole global environment is turbulent.

The problem of research: The main problem of this paper is the exploration and assessment of socioeconomic condition of selected Western Hemisphere economies in the post-crisis period.

The objective of research: The paper aims at presenting the socioeconomic situation in Western Hemisphere ten years after the beginning of the global crisis of the first decade of the 21st century. The parallel objective is to diagnose the engagement of Western Hemisphere in international trade and international transfer of capital in the analyzed period of time.

The object of research: 12 Western Hemisphere economies selected by population and area, and in particular: Argentina, Bolivia, Brazil, Canada, Chile, Colombia, Ecuador, Guatemala, Mexico, Peru, the United States and Venezuela.

The tasks of research: A) To gather statistical information regarding the socioeconomic situation in selected Western Hemisphere countries; B) To explore and diagnose the situation in the analyzed subjects in terms of socioeconomic development in order to identify the economies characterized by the highest and the lowest level of synthetic index of socioeconomic development; C) To compare the engagement of studied Western Hemisphere economies in international trade and international transfer of capital; D) To compare the studied Western Hemisphere economies in regard to international competitiveness.

The methods of research: Research tools used in the paper included literature studies, descriptive analysis and comparative analysis with the implementation of selected taxonomic methods. Statistical material provided by CIA and taken from the World Factbook was used for the analysis; additionally, UNCTAD statistics taken from the World Investment Reports and WTO data taken from WTO Database were used.

2 Research methods and input data

2.1   Research methods

The research tools used in the article included literature studies, descriptive analysis and taxonomic analysis. Due to a complexity of a category of economic development, selected taxonomic methods were applied. Research was conducted with the application of Hellwig's method of taxonomic measure of development as well as standard deviations' method. Hellwig's method of multivariate comparative analysis made it possible to make a hierarchy of the analyzed subjects, i.e. twelve Western Hemisphere economies, in regard to synthetic measure of economic development. After selecting the set of diagnostic variables, the character of each of the variables was determined. Variables were standardized and development model was constructed – a model unit, where diagnostic of variables were determined according to the rule, where:

$$z_{0j} = \max_i (z_{ij})$$

for stimuli or

$$z_{0j} = \min_i (z_{ij})$$

for destimuli.

The distance of i-unit from the development model was calculated using Euclid's measure:

$$d_{oi} = \sqrt{\sum_{j=1}^{m} (z_{ij} - z_{oj})^2}$$

Taxonomic measure of development (TMD) was calculated according to the formula (Hellwig 1968; Nowak 1990):

$$\text{TMD}_i = 1 - \frac{d_{oi}}{d_o} \ , \text{i=1,2,...n}$$

where:

$$d_0 = \overline{d}_o + 2S_0$$

and:

$$\overline{d}_0 = \frac{1}{n} \sum_{i=1}^{n} d_{oi}$$

while:

$$\text{TMD}_i \in [0; 1], \text{i=1, 2, ...n}.$$

Finally, the analyzed subjects were put in order according to the level of development expressed by taxonomic measure of development (TMD).

Additionally, the implementation of cluster analysis for the research resulted in grouping of the studied subjects – twelve Western Hemisphere economies – in four clusters according to the level of economic development measured by TMD. A selected method of grouping of linearly ordered objects, and in particular, method of standard deviations was used for this purpose. Twelve Western Hemisphere economies were divided into four clusters, according to the following rule:

$$G_1 : s_i < \overline{s} - S(s),$$
$$G_2 : \overline{s} > s_i \geq s_i - S(s),$$
$$G_3 : \overline{s} + S(s) > s_i \geq \overline{s},$$
$$G_4 : s_i \geq \overline{s} + S(s),$$

where: $\overline{s}$ - arithmetic mean of synthetic variable (in this study: arithmetic mean of TMD), while $S(s)$ - standard deviation of synthetic variable (in this study: standard deviation of TMD), s_i - value of the synthetic variable of the object i (in this study: TMD value in i Western Hemisphere economy).

2.2 Input data

The comparative study embraced 12 Western Hemisphere economies selected by population and area, and in particular: Argentina, Bolivia, Brazil, Canada, Chile, Colombia, Ecuador, Guatemala, Mexico, Peru, the United States and Venezuela. They were described by the following nine indices: X_1 – GDP dynamics (%), X_2 – GDP per capita according to purchasing power parity – (Int. \$), X_3 – share of services sector in GDP creation (%), X_4 – unemployment rate (%), X_5 – general government deficit (% GDP), X_6 – general government gross debt (% GDP), X_7 – life expectancy at birth (years), X_8 – infant mortality rate (per 1000 life births), X_9 – inflation rate (%). Table 1 presents the input data set which formed the basis for the research. Statistical information was taken from the World Factbook [29].

Table 1. Input data

Economy	X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8	X_9
Argentina	2.5	20700	60.9	8.1	6.1	53.7	77.3	9.8	26.9
Bolivia	4.2	7500	54.1	4.0	6.2	51.5	69.5	35.3	3.2
Brazil	0.7	15500	72.8	13.1	1.1	78.4	74.0	17.5	3.7
Canada	3.0	48100	70.2	6.5	2.0	98,2	81.9	4.5	1.6
Chile	1.4	24600	64.3	7.0	3.1	25.2	78.9	6.6	2.3
Colombia	1.7	14500	61.4	9.3	3.3	53.0	75.9	13.6	4.3
Ecuador	0.2	11200	59.7	5.1	5.5	41.0	77.0	16.4	0.7
Guatemala	2.8	8200	63.2	2.3	1.3	24.7	71.8	23.2	4.4
Mexico	2.1	19500	64.0	3.6	1.9	51.5	76.1	11.6	5.9
Peru	2.7	13300	56.1	6.7	2.8	25.7	74.0	18.4	3.2
United States	2.2	59500	80.2	4.4	3.4	77.4	80.0	5.8	2.1
Venezuela	-12.0	12400	57.4	26.4	38.1	25,.8	76.0	12.2	652.7

Source: *The World Factbook 2018*, CIA. https://www.cia.gov/library/publications/the-world-factbook/index.html, (accessed: 10.11.2018).

3 Presentation of research results

3.1 Disparities in socioeconomic development in the light of taxonomic research

Before the proper multidimensional comparative analysis could be begin, the socioeconomic situation in all analyzed Western Hemisphere economies was studied taking into consideration nine variables one by one. The intention of this initial study was to determine the disparities among the Western Hemisphere economies in regard to each and every variable. The initial analysis has led to the following conclusions:

- GDP dynamics in the analyzed Western Hemisphere economies ranged from minus 12% in Venezuela to plus 4.2% in Bolivia with an average amounting to 0.96%;
- The average GDP per capita (PPP) equaled 21250 Int. $, its maximum level was noted in the United States (59500 Int. $) and its minimum level was observed in Bolivia (7500 Int. $);
- The share of services sector in GDP creation ranged from 80.2% in the United States to 54.1% in Bolivia and the average for the 12 studied economies amounted to 63.7%;
- The average unemployment rate in the analyzed group of economies equaled 8.04%. The highest unemployment was observed in Venezuela (26.4%) and the lowest unemployment was noted in Guatemala (2.3%);
- General government deficit ranged from 1.1% GDP in Brazil to 38.1% GDP in Venezuela, with the average for the 12 economies amounting to 6.23% GDP;
- The average level of general government gross debt equaled 50.51% GDP; its maximum was noted in Canada (98.2% GDP) and its minimum was observed in Guatemala (24.7%);
- Life expectancy at birth ranged from 69.5 years in Bolivia to 81.9 years in Canada, and the average life expectancy at birth for the 12 studied economies amounted to 76.0 years;
- The average infant mortality rate for the analyzed group of economies was quite high – it equaled 14.57 per 1000 life births, its maximum was observed in Bolivia (35.5 per 1000 life births) and its minimum was noted in Canada (4.5 per 1000 life births);
- Inflation rate ranged from 0.7% in Ecuador to 652.7% in Venezuela and the average for the 12 economies amounted to 59.25%.

The application of Hellwig's taxonomic measure of development (TMD) made it possible to make a hierarchy of 12 Western Hemisphere economies in regard to synthetic index of socioeconomic development. Table 2 presents the results of research with the use of Hellwig's method. TMD ranged from 0.742 in the case of the United States (the unquestionable leader in terms of socioeconomic development among the twelve studied Western Hemisphere countries) to 0.040

for Venezuela (the least developed one). The top-three group included also Chile (with TMD amounting to 0.634) and Canada (for which TMD equaled 0.617). It should be stressed here that TMD for Venezuela represented only a bit over 5% of TMD for the United States. The top position of the United States resulted from several elements, namely: the 1st place in terms of GDP per capita PPP (59500 Int. $) and the highest share of service sector in GDP creation (80.2%), as well as the 2nd lowest infant mortality rate (5.8 per 1000), the 2nd highest life expectancy (80 years) and the 3rd lowest inflation rate (2.1%). On the other hand, Venezuela's last place with respect to synthetic index of development expressed by TMD resulted from: the very last position of this country in terms of GDP dynamics (minus 12%), the highest unemployment rate (26.4%), the highest inflation rate (hyperinflation amounting to 652.7%) and the highest budget deficit (38.1%); moreover, Venezuela was characterized by a relatively low share of service sector in GDP creation (57.4% GDP which resulted in the 10th position among the studied economies).

Table 2. Socioeconomic development of 12 Western Hemisphere economies measured by Taxonomic Measure of Development - TMD

Position	Economy	TMD
1	United States	0.742
2	Chile	0.634
3	Canada	0.617
4	Mexico	0.560
5	Argentina	0.541
6	Colombia	0.492
7	Ecuador	0.481
8	Brazil	0.455
9	Peru	0.426
10	Guatemala	0.408
11	Bolivia	0.219
12	Venezuela	0.040

Source: Own calculations.

The next stage of research was the application of standard deviations' method of linearly ordered subjects' classification. As a result, the twelve Western Hemisphere countries were divided into four classes (according to the level of their socioeconomic development), where class G4 included countries with the highest TMD (TMD of those economies amounted to at least arithmetic mean of TMD plus standard deviation of TMD), and class G1 included economies with the lowest TMD (for those economies TMD was lower than arithmetic mean of TMD minus standard deviation of TMD). The results of analysis with the adoption of standard deviations' method of classification of linearly ordered subjects for the year 2017 are presented in table 3.

In 2017 there was only one country in class G_4, i.e. the United States of America. The next class, i.e. G_3, was formed by six economies, namely: Chile, Canada, Mexico, Argentina, Colombia and Ecuador. Class G_2 embraced three countries, in that: Brazil, Peru and Guatemala. Class G_1 was formed by two economies with the lowest level of synthetic measure of economic development TMD, namely: Bolivia and Venezuela.

Table 3. Division of 12 Western Hemisphere Economies into Classes

Economy	Class
United States	G_4
Chile	G_3
Canada	G_3
Mexico	G_3
Argentina	G_3
Colombia	G_3
Ecuador	G_3
Brazil	G_2
Peru	G_2
Guatemala	G_2
Bolivia	G_1
Venezuela	G_1

Source: Own calculations.

3.2 Western Hemisphere economies as participants of international trade and international transfer of capital

The international position of a national economy in the world economy is determined to a great extent by its engagement in international trade and international transfer of capital. Table 4 presents data regarding merchandise exports and imports of the studied Western Hemisphere economies in 2007 (just before the global crisis) and in 2017 (the last year for which statistical information was available). In 2007 the studied 12 Western Hemisphere economies accounted for 16.15% of world merchandise exports, while in 2017 they represented 16.13% of World exports; that means no significant change in the position of the region in the global economy in terms of merchandise exports was observed. When it comes to individual countries from the analyzed region, one should note a slight increase of the United States' share in world merchandise exports (from 8.13% in 2007 to 8.63% in 2017) as well as a bit higher increase in the case of Mexico (from 1.93% to 2.30%). At the same time the share of Canada in world merchandise exports was reduced to 2.36% (from initial 2.98%). Between 2007 and 2009 the United States held the number one position in the World in terms of merchandise exports, since 2010 the United Sates has been classified as the 2nd biggest merchandise exporter in the World (outpaced by China). The United States, Canada, Mexico

and Brazil represented as much as 87.9% of total merchandise exports of the twelve Western Hemisphere countries in 2007 and as much as 90.2% in 2017, which means that the above listed four Western Hemisphere economies determined the position of the region in terms of merchandise exports.

In the analyzed period of time the share of the 12 economies in world merchandise imports was slightly reduced: it amounted to 21.32% in 2007 and 20.61% in 2017. The United States managed to protect its leading position in the World in terms of merchandise imports though its share dropped from 14.12% in 2007 to 13.36% in 2017. One should stress an increase in the share of Mexico in world merchandise imports (from 2.03% in 2007 to 2.4% in 2017). Four Western Hemisphere economies, i.e. the United States, Canada, Mexico and Brazil accounted for 19.77% of world merchandise imports in 2007 and 19.08% in 2017; that means that the aforementioned countries represented as much as 92.73% of the region's merchandise imports in 2007 and 92.56% in 2017. Again, the four economies determined the position of the region in the global economy in terms of merchandise imports.

Table 4. Merchandise exports and imports of Western Hemisphere economies in 2007 and 2017

Economy	Merchandise exports				Merchandise imports			
	Billion USD		% World		Billion USD		% World	
	2007	2017	2007	2017	2007	2017	2007	2017
Argentina	55779	58427	0.40	0.33	44706	66899	0.31	0.37
Bolivia	4504	7752	0.03	0.04	3586	9304	0.03	0.05
Brazil	160649	217756	1.14	1.22	126645	157502	0.89	0.87
Canada	420693	421101	2.98	2.36	390188	442184	2.73	2.45
Chile	67972	69230	0.48	0.39	47164	65062	0.33	0.36
Colombia	29991	37881	0.21	0.21	32897	46076	0.23	0.26
Ecuador	14321	19122	0.10	0.11	13893	20010	0.10	0.11
Guatemala	6898	11001	0.05	0.06	13576	18389	0.09	0.10
Mexico	271821	409401	1.93	2.30	290246	432153	2.03	2.40
Peru	28094	45275	0.20	0.25	20368	39883	0.14	0.22
United States	1148199	1546270	8.13	8.68	2020403	2408480	14.12	13.36
Venezuela	69980	31410	0.50	0.18	46097	10505	0.32	0.06
World	14116000	17820000	100.00	100.00	14309000	18028000	100.00	100.00

* - provisional data

Source: WTO Statistics Database, http://stat.wto.org/Home/WSDBHome.aspx, (accessed: 6.12.2018) and own calculations.

Statistical information on the participation of the 12 Western Hemisphere economies in international commercial services trade in 2007 and 2017 was presented in table 5. Altogether the studied economies accounted for 17.11% of world commercial services in 2007; in 2017 eleven of them (there was no data available for Venezuela) represented 18.02% of world commercial services exports. The United States with its 13.15% in 2007 and 14.38% in 2017 hold the number one position in the World as the leading commercial services exporter. In 2007 the United States alone represented almost 77% of total commercial services

exports of the studied region, while the United States and Canada stood for as much as 88.25% of total commercial services exports of the studied group of economies. In 2017 the share of the United States in commercial services exports of the 12 Western Hemisphere economies amounted to 79.8%, while the share of the United States and Canada represented as much as 88.79% of total commercial services exports of the analyzed region. The two aforementioned economies determined the position of the studied Western Hemisphere in the global economy in terms of commercial services exports in a predominant way.

When it comes to commercial services imports, the share of the analyzed region in the World amounted to 15.64% in 2007 and it reached 15.81% in 2017 for eleven of them (there was no data available for Venezuela for 2017). The United States with its 10.3% share in world commercial imports in both 2007 and 2017 held the number one position in the World. Canada accounted for 2.44% of world commercial services imports in 2007. In 2017 its share was a bit lower – it equaled 2.1%. It is worth noting that the share of Brazil in world commercial services imports increased from 1.04% in 2007 to 1.33% in 2017. The United States alone accounted for around 66% of total commercial services imports of the studied region in 2007 and for about 65.3% in 2017. The United States, Canada and Brazil represented as much as 88% of total commercial services imports of the twelve Western Hemisphere economies in 2007 and for almost 87% in 2017.

Table 5. Commercial services exports and imports of Western hemisphere economies in 2007 and 2017

| Economy | Commercial services exports | | | | Commercial services imports | | | |
| | Billion USD | | % World | | Billion USD | | % World | |
	2007	2017	2007	2017	2007	2017	2007	2017
Argentina	9915	13937	0.28	0.26	10721	23758	0.32	0.48
Bolivia	676	1339	0.02	0.03	880	2985	0.03	0.06
Brazil	22615	33677	0.64	0.64	34700	66293	1.04	1.33
Canada	69289	85666*	1.95	1.62	81384	105240*	2.44	2.10
Chile	9022	10209*	0.25	0.19	9453	13062*	0.28	0.26
Colombia	3899	8353*	0.11	0.16	6752	11792*	0.20	0.24
Ecuador	1118	2177	0.03	0.04	2487	3200	0.07	0.06
Guatemala	1619	2753	0.05	0.05	2017	3202	0.06	0.06
Mexico	17425	26920	0.49	0.51	25472	36664	0.76	0.73
Peru	3022*	7209*	0.09	0.14	4224	8649*	0.13	0.17
United States	467475	761724*	13.15	14.38	344315	516018*	10.31	10.32
Venezuela	1748	l.d.	0.05	l.d.	10723	l.d.	0.32	l.d.
World	3554000	5297000	100.00	100.00	3341000	5000000	100.00	100.00

* - provisional data

Source: WTO Statistics Database, http://stat.wto.org/Home/WSDBHome.aspx, (accessed: 6.12.2018) and own calculations.

The position of a national economy or a region in the global economy is determined not only by the intensity of its international trade relations but also by its international capital ties. Due to a particular significance of international transfer of capital in the form of foreign direct investment (FDI) the study

included the analysis of participation of the twelve Western Hemisphere countries in international transfer of capital in the form of FDI. Table 6 presents the engagement of the 12 studied Western Hemisphere economies in international transfer of capital in the form of FDI expressed by inward and outward FDI stock. Data for both 2007 and 2017 were presented in order to identify changes in the overall situation and relative international position of the analyzed countries.

Table 6. Inward and outward FDI stock of Western Hemisphere economies in 2007 and 2017

| Economy | Inward FDI stock | | | | Outward FDI stock | | | |
| | Billion USD | | % World | | Billion USD | | % World | |
	2007	2017	2007	2017	2007	2017	2007	2017
Argentina	67.57	76.58	0.43	0.24	27.54	40.94	0.17	0.13
Bolivia	5.48	12.30	0.03	0.04	0.09	0.73	0.00	0.00
Brazil	309.67	778.29	1.98	2.47	136.10	358.91	0.84	1.16
Canada	497.20	1084.41	3.17	3.44	521.65	1487.13	3.21	4.82
Chile	99.49	275.29	0.64	0.87	32.69	124.28	0.20	0.40
Colombia	56.45	180.23	0.36	0.57	10.93	55.51	0.07	0.18
Ecuador	11.33	17.25	0.07	0.05	0.20	1.92	0.00	0.01
Guatemala	4.62	15.52	0.03	0.05	0.32	0.99	0.00	0.00
Mexico	272.73	489.13	1.74	1.55	44.70	180.06	0.28	0.58
Peru	26.81	98.24	0.17	0.31	1.54	5.45	0.01	0.02
United States	2109.88	7807.03	13.47	24.77	2916.93	7799.05	17.98	25.29
Venezuela	43.56	22.17	0.28	0.07	14.92	25.40	0.09	0.08
WORLD	15660.50	31524.36	100.00	100.00	16226.59	30837.93	100.00	100.00

Source: World Investment Report 2018. Investment and New Industrial Policies, UNCTAD, New York – Geneva 2018; World Investment Report 2009. Transnational Corporations, Agricultural Production and Development, UNCTAD, New York – Geneva 2009; World Investment Report 2010. Investing in a Low-Carbon Economy, UNCTAD, New York – Geneva 2010 and own calculations.

Inward FDI stock in the studied Western Hemisphere economies amounted to USD 3504.79 billion in 2007 and it increased to USD 10856.32 billion in 2017. The share of the analyzed region in the World in terms of inward FDI stock equaled 22.38% in 2007 and it increased significantly to as much as 34.44% in 2017. The leading position of the United States with its inward FDI stock worth USD 2109 billion in 2007 and USD 7807 billion in 2017 meant the share of the US economy in the World of 13.47% in 2007 and 24.77% in 2017. When it comes to the US position among the studied economies in regard to inward FDI stock, it increased from 60% in 2007 to 71.9% in 2017. Three more Western Hemisphere economies must be listed here as important recipients of FDI, and in particular: Canada, Brazil and Mexico. The four Western Hemisphere economies listed above, accounted for over 91% of total inward FDI stock in the analyzed region in 2007 and for almost 93.6% in 2017; that means that the four economies represented as much as 20.36% of world inward FDI stock in 2007 and 32.23% in 2017.

Outward FDI stock of the 12 Western Hemisphere economies amounted to USD 3707.61 billion and it reached USD 10080.37 billion in 2017. The share of the studied region in the world in terms of outward FDI stock equaled 22.85% in 2007

and it reached 32.67% in 2017. Obviously, the United States itself represented the vast majority of the whole outward FDI stock of the studied region: as much as 78.69% in 2007 and 77.41% in 2017. The international position of one more economy should be mentioned in regard to outward FDI stock, namely: Canada. Outward FDI of Canada increased from USD 521 billion in 2007 to 1487 billion in 2017 and its share in the world rose from 3.21% to 4.82% respectively. The United States and Canada accounted for 81.9% of total outward FDI stock of the region in 2007 and they represented as much as 82.23% of total outward FDI stock of the 12 Western Hemisphere countries in 2017. The position of other Western Hemisphere economies in terms of outward FDI was marginal.

3.3 Disparities in international competitiveness

Table 7 presents disparities in international competitiveness of the analyzed 12 Western Hemisphere economies and changes of their competitive positions between 2008-2009 and 2018 in the Global Competitiveness Reports published by World Economic Forum.

Table 7. The Global Competitiveness Index of Selected Western Hemisphere Economies according to World Economic Forum i 2008-2009 and 2018

Specification	2008-2009	2009-2010	2017-2018	2018	2008/09 - 2018 change
United States	1	2	2	1	0
Canada	10	9	14	12	-2 ↓
Mexico	60	60	51	46	+14 ↑
Argentina	88	85	92	81	+7 ↑
Brazil	64	56	80	72	-8 ↓
Bolivia	118	120	l.d.*	105	+13 ↑
Chile	28	30	33	33	- 5 ↓
Colombia	74	69	66	60	+14 ↑
Ecuador	104	105	97	86	+18 ↑
Guatemala	84	80	84	96	-12 ↓
Peru	83	78	72	63	+20 ↑
Venezuela	105	113	127	127	-22 ↓

* - excluded from the GCR due to insufficient data

Source: The Global Competitiveness Report 2008-2009, ed. M.E. Porter, K. Schwab, WEF, Geneva 2008; The Global Competitiveness Report 2009-2010, ed. K. Schwab, WEF, Geneva 2009; The Global Competitiveness Report 2017-2018, ed. K. Schwab, WEF, Geneva 2017; The Global Competitiveness Report 2018, ed. K. Schwab, WEF, Geneva 2018.

The United States of America was classified on the 1st position in 2018 ranking and it also took the 1st place in 2008-2009 ranking. Canada took the 12th position in 2018 ranking (in the 2008-2009 edition it was positioned even two places higher). Chile was classified as the 33rd most competitive economy in 2018 ranking and as the 28th one in 2008-2009 ranking. Moreover, Venezuela took the lowest position in 2018 ranking of all twelve studied Western Hemisphere

countries (it was classified as the 127th economy). The 105th position was taken by Bolivia in 2018. When it comes to 2008-2009 ranking Bolivia was the least competitive economy of the twelve studied Western Hemisphere countries (118th position) and Venezuela was classified above Bolivia then (it took the 105th place). It is worth mentioning here that six studied economies significantly improved their international competitive positions between 2008 and 2018: Mexico (+14 places), Argentina (+7 places), Bolivia (+13 places), Colombia (+14 places), Ecuador (+ places) and Peru (+20 places). On the other hand, however, in case of five studied Western Hemisphere economies international competitive position worsened over the last ten years: Canada (-2 places), Brazil (-8 places), Chile (-5 places), Guatemala (-12 places) and Venezuela (-22 places).

4 Discussion

There have been numerous studies relating the development of national economies and regions in post-crisis period. Miles studied the impact of the United States on business cycles in Latin American economies [14]. Arsel, Hogenboom and Pellegrini analyzed the role of the state and the intensification of natural resources extraction in Latin America [2]. Institutions as a key variable for economic development of Western Hemisphere economies was discussed by Vianna and Mollick (2018). The role of institutions was also studied by Mingo, Junkunc and Morales (2018). Redelico, Proto and Ausloos [23] investigated the duration of recession and prosperity in selected 19 Latin American economies. Purchasing power parity for selected Latin American countries was evaluated by He, Chou and Chang [8]. The need for a sustainable growth was stressed by Roman-Collado and Morales-Carrion[24], Toumi, Le Gallo and Rejeb [30], as well as Desbureaux and Rodella (2019). The development profiles of Latin American countries in terms of techno-economic and socio-political spheres were discussed by Dutrenit, Natera, Anyul and Vera-Cruz [6]. The problem of limited innovation and innovativeness of Latin American countries was examined by Fernandez [7], Crespi and Zuniga [4]. The significance of well-developed transport infrastructure for the promotion of economic development was stressed by Tei and Ferrari [25]. The connection between economic growth and transport energy consumption in Western Hemisphere economies was evaluated by Rehermann and Pablo-Romero [22]. The problem of educational inequality in Latin America was studied by Neidhofer, Serrano and Gasparini [17]. The connection between foreign direct investment and economic growth was studied by Alvarado, Iniguez and Ponce [1]. The problem of monetary policy and its impact on productive activity in selected Latin American countries was discussed by Otero [19]. The so far advancement of and prospect for further digitalization of Latin American countries was assessed by Katz and Callorda [11], while the development of e-government is some Western Hemisphere states was evaluated by Lau, Aboulhoson, Lin and Atkin

[13]. Environmental inequalities in Latin America were studied by Laterra, Nahuelhual, Vallejos et. al [12]. Recent transformations and current challenges in a changing world for Latin America were discussed by Bianchi, Mingo and Fernandez [3]. Taxonomic methods have been applied for the evaluation on economic development by Pawlas [20][21], Młodak [16].

There is a gap in recent literature regarding the assessment of disparities in development among Western Hemisphere countries ten years after the global crisis 2008+ with the implementation of taxonomic methods (multivariate comparative analysis) accompanied by the study of their group role in international trade and international transfer of capital in the form of FDI. Therefore, the undertaken research has filled in the existing gap.

5 Conclusions

The contemporary world economy undergoes dynamic changes determined by various economic, social and political factors. On the one hand, the changes remain immanent feature of progress and development, on the other, however, they bring numerous challenges for individual subjects of the world economy, as well as its functioning as a system. Global economic environment becomes more and more turbulent. Multidimensional, complex and radical character of the changes in the development conditions means transition towards a new paradigm of the world economy development. Post-crisis period brought significant changes in the global world economic order and considerable changes in the intensity and forms of international economic relations. Undertaken research proved the existence of huge disparities among the analyzed 12 Western Hemisphere economies ten years after the global crisis 2008+. The studied group entails both well developed economies (The United States, Canada, Chile) and the ones characterized by a really low level of socioeconomic development (Venezuela, Bolivia). Moreover, the analyzed economies differ significantly both in regard to international competitiveness and the engagement in international trade and international transfer of capital in the form of FDI. What's more, in the case of many of them huge income disparities remain a serious problem. The Gini index amounting to as much as 50 or more was characteristic for two Western Hemisphere economies: Brazil (51.3 – 2015) and Colombia (51.1 - 2015). In the case of Guatemala, it amounted to 48.7 (2014) and in the case of Mexico the Gini index equaled 48.2 (2014). The Gini index for Chile reached 47.7 in 2015. In the case of Venezuela, it amounted to 46.9 in 2006 (unfortunately this was the very last year for which the Gini index for this country was published; it seems' however, that the recent problems of the Venezuelan economy had to be reflected in the considerably worsened situation in terms of income inequalities). The Gini index for Ecuador amounted to 46.5 (2015) and for Bolivia it was 45.8 (2015). In

the case of the Peruvian economy the Gini index equaled 44.3 (2015). The Gini index for Argentina amounted to 42.7 (2014). The United States represented the Gini index of as much as 41 (2013). Canada was the economy with the lowest level of income inequalities among the studied 12 Western Hemisphere countries – the Gini index in Canada amounted to 34.0 (2014) [10].

When it comes to the limitations of the research, one ought to consider the number of studied objects, the set of diagnostic variables, as well as the period of research. Future research ought to embrace more Western Hemisphere countries and a longer period of time. One could also point out to the possibility of evaluating separately a number of fields, e.g. demographic potential, labor market, technical and technological infrastructure and economic potential. Moreover, specific institutional and systemic features of individual Western Hemisphere states ought to be analyzed. Unfortunately, due to the limited scope of the article, it was not possible to include more elements in the current research. Additionally, some limitations resulted from the lack of statistical data for all studied Western Hemisphere countries or the analyzed year (e.g. initially it was planned to use two additional diagnostic variables, namely: R&D expenditure as % GDP and number of granted patents by US Patent Office; unfortunately, those statistical data were not available for 2017 for all analyzed 12 Western Hemisphere countries). Moreover, the future analysis of the engagement of the studied Western Hemisphere economies in international trade and international transfer of capital should include both geographical pattern of merchandise exports and imports, commercial services exports and imports, as well as inward and outward FDI stock.

Acknowledgement

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Work, stress vs. hobby, flow

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Abstract: What could an ordinary adult do if the work stress decreases the effectiveness and happiness? What can they do to survive the hardest situations during work? Is free time enough to help? Can we say some of the free time activity is the solution to every problem? Or do we have other possibilities? The author tries to find the answer to these questions based on a survey. The interviewees were intellectuals, as the questionnaire focused most on how the ongoing psychological burden could be processed by the respondents. Finally, the research also focused on how flow can help to treat stress.

Keywords: human sustainability, stress, flow

1 Introduction

In my research, my aim is to find the answer how people, the most sensitive form of resource can be motivated to work in a most effective way without putting too much negative stress on them. While the efficiency of a machine and the lifecycle of a product can be calculated accurately, the exchange rates on stock markets can be predicted relatively well, in case of humans, these are not so obvious. Today's consumer is extremely sensitive to environmental awareness and sustainable development. Some consumer groups, with their individual purchasing power, want to achieve a global ecological and societal change of approach [1]. Similarities exist regarding geological, economic and cultural areas, age, gender and education, which all can provide some hints, but to discover each individual's motivation is almost impossible.

According to a survey 2017, the hours worked per week were 3,1 hours higher than the OECD average, however, our 39,7 hours average is still behind the theoretical maximum of a 40-hour workweek spent in a workplace [2]. These hours do not include commuting, housework, studying and any part-time jobs. How much time can be spent regenerating? What can really relax people? Can they relax at all? Can they get back the energy needed for work?

In order to find answers, I carried out a questionnaire survey among active white collars of working age. The results showed that compared to statistics the work clearly balances the scales. I aimed to identify their living conditions, their

surroundings, their health status, their work and the stress affecting them. Furthermore, I tried to prove one assumption and see how and to what extent Flow, a popular theory published by Mihaly Csikszentmihalyi, is able to relax the respondents in their free time or work time.

2 The structure of the questionnaire

As it is expected from a professional point of view, for my quantitative research first I pre-tested the questionnaire with 31 respondents before spreading it on a wider scale. My questionnaire is made of 57 questions and divided into 4 parts:

- Personal questions (17)
- Health-related questions (14)
- Work and stress-related questions (14)
- Flow – work and free time (12).

The questionnaire includes an explanation of the concept of 'flow' by Laszlo Mero. As he puts it, in the Flow state of mind people can completely be immersed in an activity that makes them energized, relaxed and filled with joy, what is more, they want to continue that at any price [3]. It was important to define Flow for those who already experienced that but could not identify it.

The questionnaire mainly consists of closed questions (multiple choice, attitude scale), but in some cases, I used assessing and open questions which are needed for the upcoming qualitative research. By using these questions, a possible draft can be drawn for future interviews and questionnaires.

3   The results of the questionnaire

3.1   Introducing the sample

The respondents consist of 17 man and 14 women, 75% is over 35 years old (the participants examined are between the age of 21-61), therefore the variability based on age is vast, but at the same time, I could examine answers of more age groups. I put several questions about their marital status and living environment and it showed the 77% of the responders live with their family, with 4 exceptions all of them in Transdanubia or Pest county, mostly in cities or in Budapest. It follows from the previous fact that 45% live in a flat without a garden, however, the ratio of a detached house is still high. 74% have an academic or higher degree, which is not representative regarding the population of Hungary since 15,5% of

the population had higher-education diploma according to the population census 2011 [4]. Two-thirds of the responders work as full-time employees (8 hours/day) either fix or flexi-time. The 3 people who work as part-timers (4 or 6 hours/day) are women. One-third of them have a part-time job, typically they do the same as sole proprietorships as in their full-time job. Another one third enrolled in MSc or PhD programs, 4 of them indicated both a part-time job and further education in their answers. The responders work equally in the public sector, for multinational companies or small and medium-sized enterprises, and they are 16:15 satisfied with their salaries.

3.2 Health-related questions

This set of questions was relevant to identify the routine regarding general health status, eating habits and sport activities.

According to Csikszentmihalyi's theory, those individuals who move more frequently, experience Flow more often, because this feeling is triggered more easily by these many times repetitive or even improvisational processes. For instance, the joy of dance has been part of every culture since ancient times [5]. This point of view is confirmed by Bryson and MacKerron, as they believe moving is such a free time activity that is the second biggest source of joy in their respondents' lives furthermore, for those who participated in their experiment, time spent eating is also more comforting and blissful compared to other everyday activities [6]. It is interesting to see that sport plays an important role in those lives who already spend much time with work or necessary but not fun activities. Figure 1 shows that correlation, but this ought to be analysed better because it is possible that this rate is due to the low number of respondents. While preparing the next questionnaire or even during the in-depth interviews it is worth focusing on this subject.

Figure 1. How important is the sport in your life?
Source: Author's own elaboration

Those who answered my questionnaire evaluated their health status to 7,5 out of 10 points (no one gave less than 3 points). Regarding how they take care of their own health they gave 9 out of 10 points, which contradicts the fact that one-third of them never or less frequently than annually take part in health-screening or preventive medical examinations.

20 people never claim sick pay, some of them take 5-10 days as a paid holiday, and the others who are self-employed solve this issue in an alternative way to the detriment of their income and health. Due to these facts it is difficult to define the real period when they are incapable of work furthermore, it is clear that those days spent on sick leave shorten the length of relaxing holidays.

It can be observed that most of those employees who work in the civil sector or in SMEs do not receive any support from the employers and go only compulsory health-screenings annually or in every second year, while the multinational companies contribute in many ways to maintain their employees' health. These companies organize local health-screenings, have healthcare partners or provide useful information for their staff during meetings and lectures. Unfortunately, we can see that the social sustainability from the employers' side is still in its early stage.

Regarding mindful eating, the outcomes show a significant difference. The 6.8 points were obtained after getting 7-8-9-10 points from many participants and receiving 3 points from 4 and only 1 point from 2 respondents. Likewise, the importance of sport got the same result 6.8 points, but here the standard deviation was not as high as in the previous case since no one gave less than 3 points.

Approximately two third of them do sport once or more times in a week, cycling, running and hiking were indicated as the most popular activities (approx. 1/3 marked all of them). It is interesting to note that despite 50% having a garden, only 2 of them mentioned gardening as a preferred free time activity. I must highlight the positive result that the respondents spend at least 1 hour doing these activities on every occasion.

Overall, apart from one respondent none of them suffers from chronic diseases, therefore, their answers could provide quite a good picture of the worldview of the healthy working age population. That is why the results regarding the importance of mindful eating and sport (6.8 points) being just a little bit higher than medium give cause for concern.

3.3   Work and stress-related questions

Nowadays, companies are constantly undergoing renewal. The change in the workplace environment is also the cause of organizational and individual stress. [7]The first set of questions measures satisfaction levels. One question examined how satisfied the respondent is with his or her life situation, where the average

result was 6.8 point in the 1-10 Likert scale. One person gave 1 point and another one gave 10 points. The average result regarding their satisfaction with work and education was higher, 7.1 points. Then the next question was about stress, which indicated that the respondents' lives are rather calm because the average result was 4.1 points. It cannot be seen clearly from such a small sample what sort and amount of stress can occur in various types of workplaces, but it can be said that sole traders have 1-2 points higher stress levels than the others working in different sectors.

There was no direct correlation neither between the level of life satisfaction and stress level nor worktime/learning time/ housework and kids/ average time of daily commuting as it is shown in Figure 2.
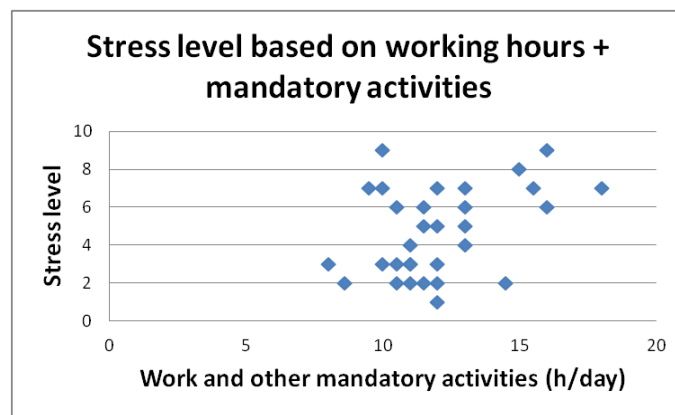
Figure 2. Stress level based on working hours + mandatory activities

Source: Author's own elaboration

The work time of the respondents was between 3-15 hours with an average of 8.2 hours, but the previously mentioned 4 activities took 12 hours from their day. Consequently, the mandatory activities take half a day and if we consider the waking hours, we can see there is not much time left for recreation, sport, hobby, family and relations, as it is shown in Figure 3.

Figure 3. Work and other mandatory activities (h/day)
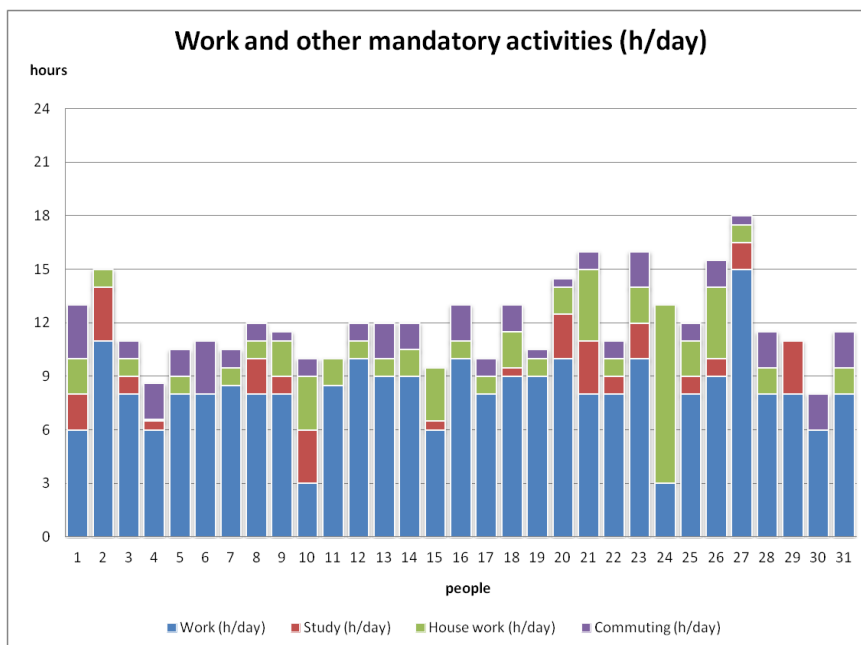
Source: Author's own elaboration

Due to the low stress-level, it is not surprising that with two exceptions the average of stress factor levels that were defined previously by using attitude scale 0 to 10 did not reach even the mean value. These two factors were the politics and the world around us. The everyday work, the co-workers, the leaders and partners reached higher rates only in case of few respondents. In general, they were rather concerned about their future prospects and financial situation or because of their age, they were worried about their parents or children. From the various forms of stress, most participants complained about lethargy and decreasing of work morale (10-10 people), depression (9 people), anxiety (5 people) and sleeping problems (4 people).

I was interested in how they try to reduce stress. Approximately in 20-22 cases family members, friends and gatherings, in 13 cases sport, in other 12 cases writing or reading came up as solutions. Unfortunately, in the first group alcohol appears also as a solution (drinking beer, partying), moreover, 3 people mentioned directly alcohol consumption and this considering the fact that we talk about a very educated sample group it is distressing. According to OECD Factbook 2015-16 Hungary is on the 4th place on the list of alcohol consumption, although there is a decrease between 2000 and 2013, we are still in the top 5 [8].

Stress can lead to burnout, the chronic form of stress triggers a psychic reaction and the point of burnout is already there, which can be easily generated by

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continuous workplace stress [9]. For that reason I have found important to see if their employers help them to manage stress. 14 respondents gave a negative answer and from the others, only 5 people could mention more than 4 measures. These stress relief actions were the team building training, dinners, lunches or annual appraisals. Only a few of them mentioned the work environment and the possibility of a home office, but more of them mentioned the relationships with colleagues. It is positive that with only a few exceptions they evaluated these measures higher than the median value.

According to Schaufeli and Enzmann, it is worth organizing the causes in order to avoid burnout. The interventions can be direct and designed for the individual, which try to enhance the employees' psychological resources, or can be indirect activities reducing the factors of workplace stress by modifying the work environment. The combination of both is possible for the more effective results [10]. This is demonstrated by the fact that for the question "Do you consider important to feel happy at workplace or school?" 27 answered yes, 2 could not decide and 2 thought it was not important. In their explanation, almost all of them indicated that they spent a substantial part of your life there, so it was significant how they spend that time.

This unit is the one where the results already analysed could be supplemented by the qualitative research since even the open questions could not provide enough space for further investigations.

3.4 Flow – work and free time - questions

Based on Fullagar and Kelloway 9 component states to achieving Flow „challenge-skill balance, merging of action and awareness, clarity of goals, immediate and unambiguous feedback, concentration on the task at hand, paradox of control, transformation of time, loss of self-consciousness, and autotelic experience" [11].

By using the last chapter of the questionnaire I aimed to identify what brings the respondents joy and happiness. Csikszentmihalyi is convinced that Flow can be reached more easily at work than in our free time. This is supported by his surveys, in which 100 full-timer men and women provided 4800 answers. In contrast, my small sample analysis had a different outcome, but to see if this is really the case, I could prove it by only using a bigger sample [12].

First, I asked the respondents about their hobbies in details, because I already had the data for the work-related questions from the previous unit. The question here was about if they can deal with their work or pursue their hobbies without being disturbed because this is one essential component of Flow, or if they have ever felt exhausted in a way that the whole world disappeared. Only after this did I introduce the definition of Flow not to manipulate those who had not met this

before, however, 84% of the respondents were familiar with this. Every participant had some sort of hobby, similar activities were mentioned like in the stress-related questions, only the occurrence rate increased, and few new favourites appeared

The next two questions pointed out how my results differ from Csikszentmihalyi's. In my case, the fully immersed state, which is necessary for flow, was experienced more often while indulging in hobbies, because 21 respondents declared that they could do these without being disturbed, while in case of work only 13 people gave this answer. The rate is a bit better in case of doing a hobby (8 people) or work (13 people) in a partly calm environment.

In the next question, the participants could choose when they feel Flow while doing the most popular activities. In Figure 4 it is shown that hobby and meeting with friends, the free time activities forego the occurrence of work-related Flow. However, if we consider how many people were able to work without being disturbed, it seems to support Csikszentmihalyi's theory.

Finally, I asked the respondents if they could see any correlations between stress and Flow, the answer was yes with 2 exceptions. Most of them believed Flow can reduce stress because they gave 8 points out of 10 for experiencing that. Two-thirds of them feel effective while having a Flow experience, but many respondents did not suggest the possibility of introducing Flow to workplaces, because as they experienced, they are not precise or fast enough in such condition. Moreover, some respondents considered it clearly impracticable in modern open plan offices or even dangerous while working with heavy machines.
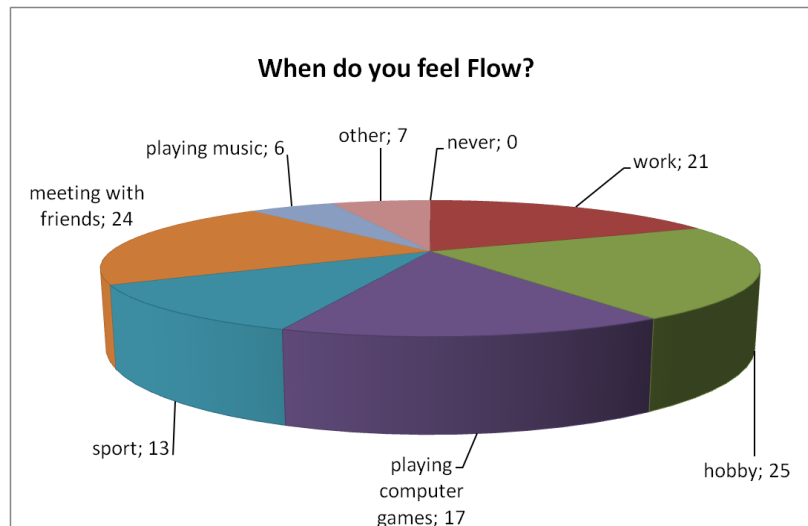

Figure 4. When do you feel Flow?
Source: Author's own elaboration

Conclusions

The processing of questionnaires has not been completed yet, because the areas analysed offer more research opportunities, but in order to reach results, I must focus on the possibilities of reducing the stress to persons involving or caused by the work environment. For example, it would be interesting to examine how Flow can be experienced in the thin area between stress and boredom [13] and how to maintain it while cooperating with colleagues, [14] or which factor can be influencing and how their effects can be strengthened or reduced consciously by either the employees or the employers.

By editing the questionnaire, the non-relevant questions must be filtered out from the original 57 questions, in-depth interviews and more research will be needed in the field of stress and Flow. It could be worth defining the positive or negative effects of stress, since a given situation might inspire some and might demoralize others.

However, while I was sending out the questionnaire, I did not focus on intellectuals, but since the topic area and as a consequence, the questionnaire needs to be segmented, it is worth targeting those who do white collar jobs. The regeneration of these employees is the least analysed area, however their work is effective in many areas, it does contribute directly just in a very small amount to a product – let us just think of the scope of a controller or HR worker at a multinational car manufacturing company – but they still have an essential part of the whole, since they do an important and responsible work day by day. White collar workers regardless of which sector they work in might fall the victim of everyday stress. As it turns out from the questionnaire, they might have not only mental but physical symptoms which in the worst-case scenario lead to burnout, which is still not well-known for us and which must not be treated but prevented.

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Making marketing strategy and integrated marketing communication in the service market

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Abstract: Targeted and continuous marketing activity is the most important factor nowdays for improving the market position of a company, conquering appropriate new target groups, keeping loyal partners, and positioning services. Service companies have less used marketing tools in their activities, so they have lagged far behind the production companies, but this has changed completely nowadays. While organizing the market activities of service companies the new challenge is to mandate customers, to manage cooperation between partners and the service provider, and to meet the high expectations of customers.Our papaer presents a marketing strategy and its practical implementation at a service company in a B2B sector based on the results of their own market research. We also describe and analyse the marketing tools, channels and communication power applied by the service company for developing its image and become a market leader.

1 Introduction

Defining marketing strategy which is defining and guiding marketing activities is a basic starting point of marketing management. The marketing strategy requires a dual behavior from the marketing leadership: on the one hand, it must follow the strategy that has been developed and on the other hand, it must constantly develop it [1].

The target group of the company, the marketing tool, the content of the communication can change constantly, therefore it is necessary to transform the strategy in 2-3 years. It follows that, in relation to company-wide strategies, content flexibility and changeability in marketing are extremely important criteria

[2].

The company's clear objective is to become a profitable, market leader with a positive professional appearance on the market, with the following characteristics: strategic concept, long-term commitment to top management, high standards, profit levels, service performance and customer feedback systems [1].

In our paper we will first present an analysis of the company's environment for strategic planning, then we will present the milestones needed for accurate market position assessment, the resulting objectives, and finally, the integrated marketing communication tools will be published.

2 Analysis of the market environment

Before making the company's marketing plan, it is essential to analyze the company's environment. The company's macro enviroment analysis should be carried out by applying PESTEL analysis, in which we look for environmental determinants that are relevant to the company [3].

Political conditions have an impact on the marketing of service companies, so we need to look at the status of a government party, for example, whether there is a change in public procurement or public tenders.

Examining the economic environment includes the business circumstances that need to be considered when a company is planning to enter the market [4]. In the beginning of 2016, the European Commission noted that there is no imbalance in the economy, public investment is growing, and at government level the access to cushioned funds is accelerating in the new EU financial cycle (2016-2020). Due to the low budget deficit and the stability of the European Union's resources, the state has the opportunity to support lending and investment-intensive businesses - new tendering opportunities are formed for service development and asset purchasing. The boom in construction and the growth of investments create a favorable economic environment.

When examining the social / cultural environment, the following trends can be observed in the service sector:

At the corporate and consumer level, the quality of life is further intensified; the customer becomes the active part of the service environment during the service delivery, the design of complex services, all parts of the process, come to the fore. Social responsibility is focused on: an ethical, environmentally conscious company chooses a supplier for a partner who also takes into account the accepted moral values and is environmentally conscious. In the future, transformative services are noticeably on the forefront: these are the issues that focus on the relationship between consumers and social welfare in general.

When we look at the technical environment, we can conclude that information about the company related to the Internet (website, apps, YouTube, influencers' comments) becomes more pronounced than the other tools used in the promotion mix (publications, forums, exhibitions).

Self-service technologies (SSTs) are developing dynamically, which includes the so-called smart services. They are a smart tool for continuous communication and interactive feedback. Customers need complex solutions to which the latest advances in the IT sector are essential. Customers are becoming more open to joint developments, launching R & D projects. Instead of a 'final customer', it is a 'value-maker' who works with companies in innovation processes. This is due to the global proliferation and rapid adaptation of digital technologies.

It is important that the company monitors macro- and micro-environmental factors affecting its profitability, a suitable method for this is SWOT analysis [1]. The strengths of the company include market leadership, broad serviceportfolio (a service palett az raklap), expert, motivated staff, and financial stability. This includes strong media presence, professional recognition, reputation, modern technical background, and speed in delivering services. Weaknesses include high levels of information loss during processes, slow flow of information within the company, lack of databases and analysis of decisions, and lack of ownership in some cases. Like other companies in the market, the company has to struggle with increasing fluctuation and slowdown in logistic processes due to size growth. One of the company's options is searching for additional market segments, opening up to new areas/businesses, selling abroad and taking advantage of the opportunities offered. As a threat, the high cost of service development is threatening, coupled with the decline in solvent demand, the changing demand for customers and their rapid reaction, the presence of stronger competitors on the market and the limitations of legal regulation.

We analyzed the company's competitive position based on the Porter's five-forces analysis. According to this model, industry competition is determined by five factors (five forces) - the threat of new entrants, substitute products, buyers' bargaining power, suppliers' bargaining power, and competition with existing competitors [5].

The high entry barrier prevents massive entry of competitors into the market: the high cost of economies of scale and the cost of investment in equipment both curb new entrants. The know-how of the company's employees provides a cost advantage for the company in the market. By maintaining a high level of service and financial stability, customers' 'brand loyalty' (in this case their loyalty to the company) can be maintained and the 'migration' to new entrants can be reduced. The basis for maintaining loyalty is long-term balanced, stable service delivery. Providing continuous service enhancements and complementary offers and discounts to partners can also prevent customers from letting new entrants 'seduction'. International presence is a positive externality that strengthens the

Hungarian company's position in the Hungarian market. The company's existence does not depend on the retention of some buyers, and even the vulnerability of some suppliers, the competitive position of suppliers has a positive impact on purchasing. The Pareto principle operates in the company's business: 80% of the revenue comes from 20% of the customers. Intra-industry competition is strong, services can be replaced, so, besides winning new customers, special attention should be paid to the loyalty of existing partners. Keeping track of competitors' prices, developments and customer relationships are essential to preserve market leadership.

3 Market position analysis with primary research - quantitative means

In order to get a comprehensive view of the company's market situation, primary research should be carried out every 2-3 years under the guidance of internal staff or market research firm. In the case of a service company, a survey of a sample of 200 people can be considered successful. It is important that people who are relevant to the interview are included in our sample: eg. manager, , or person who is a decision-maker regarding the services of the given company. We should adress our questionnaire to companies, that are spending a relatively large amount of money each year on the services. When using a subcontractor market research firm, the research plan should precisely define the target group and the examination themes [6]. In the questionnaire the following areas should be affected:

3.1 Awareness

Is the company as a brand highly recognizedcompared to other actors, partners only focus on their own service provider or are they watching the competitors' activities? How satisfied are the respondents with the services of the company, are they regularly competing for companies and considering switching? The method used in this case is spontaneous mention to map the visibility of a given competitor. This topic involves examining the degree of brand loyalty on the market. How much is the attitude of retreat among customers? We should also ask the question: how easy is it to seduce a client from the competition? In this case, brand loyalty has a significant impact on the differentiation of services. The customer's goal is to get the entire portfolio from a single service provider, questioning who can provide it from the company and its competitors. Experience has shown that increasing the awareness is needed to rationalize the sales processes of the company, in such a way that the central sales processes, starting

with the individual business lines and completing the marketing activity, are rounded off.

3.2 Selecting the appropriate service provider

The starting point for mapping a provider choice is whether the respondents would choose their existing partner again or seek a new service provider. At this stage, it is worth asking how many of the currently unrelated partners would consider using the service of the given company. We have to ask the main choice (favorable price, reliability, speed, expertise, customer orientation, technical equipment, etc.) spontaneously and select from the list (supported response).

If the choice of provider in the given market is based on the abovementioned brand loyalty, satisfied customers choose their existing supplier again, the challenge is to acquire new partners. It is important that the recurring element of communication is to continuously emphasize the features that the customer may have preferred through the existing channels.

Examination of the use is part of the service selection. The question is whether portfolios are shared on the market, or whether the customer orders all the services they need from a single market participant. It is also good if we find that there is a competitor on the market that is a multiple of another in terms of size or customer scope.

3.3 Defection

One of the most important elements of the market position assessment is the examination of the cause of defection. On the one hand, it is worth looking at the reason for leaving the company for the company to improve its business processes in the future. On this basis, a targeted sales activity (eg personal sale) should be developed, with which the outsourced customers can be attracted to the customers. The question is also about why competitors are opposed by their competitors. The question also includes examining why competitors are left by their own customers. It is also worthwhile to draw up an action plan for their win as they are currently actively seeking new service providers and, from their point of view, a competing company can provide more accurate service.

3.4 Frequency, portfolio, price

The basis for the use of the services is the examination of the triangle of frequency-portfolio-price. How often do partners and non-partners use the services of the company and how often do their competitors'? What kind of services do they use and what kind of composition? How much are they spending on the given

service? The latter, portfolios and price testing should also be extended to competitors. By analyzing this issue, we can answer the areas in which marketing and marketing communications are worthwhile. It should also be noted that if we do not have a specific service on the market, our customer might eventually build a similar service facility within their own company so that their external procurement in this area may be terminated.

3.5   Image and satisfaction

For this topic, we can assign new items to the aforementioned awareness examination. Are the respondents familiar with the company and its competitors, and what values are associated with the companies? It is worth examining whether the company is seen as an expert on the market and its prices are considered affordable or high. It is worth looking at the relationship between the partners in price and looking at the question of whether the higher price means better quality. Criteria for satisfaction testing can be: precision, reliability, excellent professionals, reputation, speed, technical equipment, flexibility.

Based on the results we can create the importance-satisfaction matrix from which we get answers about which primary and secondary areas to be developed and in which areas the service quality of the company is appropriate but the communication needs to be strengthened. A separate group of questions should be devoted to determining whether there is a parameter related to the affair with which the customers are expressly dissatisfied and, in the light of this, appropriate development measures should be taken.

When considering satisfaction, an important measure is the willingness to re-election and the NPS (Net Promoter Score).

3.6   Trends, future needs

At this stage we examine the future ideas of the respondents. It is worth asking questions about the direction of change in the market: if they see an upward trend or narrowing opportunities. Already the expectations of operators and customers can generate a shift in the market. It is crucial to ask how respondents think of the growth motors of the coming years. It is worth noticing trends at a macro level eg. the emergence of new companies, new products (services) on the market, stricter export conditions, economic boom and micro level: the budget of the ordering company, the transformation of procurement policy within the company. Within this topic, we can also answer the question of what additional services would be received with pleasure. For example, professional counseling, education or customer service can be expanded with full administration.

3.7 Detected communication

The preferred communication channel for the service provider is the phone and email, but the personal meeting (sale) – the typical feature of the market – is also important. Having a positive customer relationship atmosphere and making customer relationship staff helpful and flexible even determine the intercommunication. It is useful to assess whether respondents are aware of the presence of a company at professional events, conferences, whether they are aware of the company's CSR activities. We can measure how receptive they are to newsletters and how open they are to community communication.

4 Market position analysis with primary research - qualitative tools

Based on the results obtained, we can further analyze the company's market position using interviews.

It is advisable to ask the interview-participation willingness as soon as we have completed the questionnaire, so we will have a relevant list of the potential. interviewee.

The underlying topic of interviews is related to the purchase and use of the given service. We are asking which service provider they are currently in contact with, whether or not they assign it from one company, that may be fragmented or exchanged. The relevant information of the procurement is: what aspects are dominant when choosing the current service provider. Have the parameters changed compared to the previous procurement, who are the decision-makers, what is the direction of their development: they are more outsourced or placed in-house.

Next, based on questionnaire, we can deepen the issues of awareness and image. First of all, it is advisable to ask general questions about service providers' awareness (eg where you have heard from the given and competing companies, what sources they are aware of), and then ask the respondent to define the features of an ideal service company.

The next topic was about the PR: what kind of events it took to participate, whether it was useful and what was disappointing, did they meet the company as an event organizer, a sponsor, or did they recall that a service company employee delivered a lecture at a scientific conference. Did they hear a representative of the company as an expert in the media, did they meet company's articles on social media and in newsletters?

Interviews can be finished by asking about the expectations of the company's customer service as well as exploring needs and trends in the future.

5 Formulate goals in the light of the results

The results of the research can reinforce the management in many decisions that may have been formulated earlier, but the responses received may also call for new goals that have not yet been realized on the horizon of the company.

Such broad goals may include: enhancing the company's visibility to existing partners and potential partners, more effective marketing communications; introducing measurement methods to check efficiency. The development of online communication and related tools, content marketing and presence on community platforms are of utmost importance. As the image of the company is an important messenger the internal communication should be improved as well.

The next step is to transform these strategic goals into sub targets, and assign them action plans, tools, and resources. Such a sub-objective is, for example, the identification of areas and target groups to be developed per business line, the production and continuous maintenance of relevant customer lists, the definition of narrow customer types and communication channels. To reach the goals, continuous collaboration between marketing and sales areas is necessary to design conscious and targeted communication campaigns.

Measuring the effectiveness of the activities is essential for efficient operation. Within this, press communication, personal sales measurement, feedback from direct marketing and event visitors are pronounced.

6 Tools used to achieve goals

Adapting to the decisive communication trends, we use traditional marketing communication elements only at the level of mention, and we can focus on the analysis of online marketing tools for service companies. Numerous studies prove that the proper use of online communication tools dramatically increases the efficiency of the company's integrated marketing activity and thus directly affects the company's sales revenue.

The efficient marketing communication of the service provider should contain the planning and implementation of media campaigns, the conduct of PR activities (press conferences, interviews), the design, editing of publications, participation in exhibitions and conferences. The service company's reputation can be greatly

enhanced by organizing its own professional days and conferences. In the mentioned primary research and day-to-day contact, the company can explore the topics the customers interested in. At free conferences, registered guests can deepen their knowledge of the subject and the service provider can develop its personal relationship with the partner. With the broader publicity of the conference, new customers will be able to reach the horizons of the company.

In an online communications service of a service provider, priority should be given to content marketing. In the online communication it is commonly believed that negative communication is better than nothing [7], with proactive communication, a significant competitive advantage can be achieved by the service provider on the market. The tool is based on the constant monitoring of market news and changes in legislation, and the marketing expert publishes an informative article in advance of the press in accordance with the interests of market participants. The easy-to-read article is conscious, sums up information about the subject, contains embedded links to deepen the subject, and does not intimidate, but rather gives the reader some of the related features of the company.

The webpage of content marketing articles can be a sub-page of the company's own website, but it is more successful if the company operates a separate web site for that purpose. It is important that content is displayed regularly: if publishing an article at least once a week, the company as an expert may remain well-known. Using content marketing, the company determines the topics it has been associated with as an expert in the press, not just its follower, but also the launcher of the news related to the topic. As media captures articles by source placement, these impressions generate valuable clickthroughs, which is a natural promotion in Google's search. As a visual content, we prefer using videos promoting content in addition to photos embedded in your articles, which can generate additional interest in uploading to our YouTube channel.

If you are calling visitors (potential customers) to the website and landing page through the content marketing and other communication tools, these surfaces should be designed to reach the goal: e.g. service order, newsletter sign-up [8]. The landing page is the primary vendor of the website, whose task is to convert visitors to customers. The landing page can be a separate page, or a sub-page of the requesting module that has been converted for this purpose. The layout of the landing page is graphically simple, the form to be filled requires only the necessary information, with all its navigation elements directed towards the final destination - quotation request, ordering. It is important that the text of the landing page is optimized in advance by A / B split testing [8].

A good website is fast, transparent - both in wording and in use of colors - structured, not crowded and naturally responsive. In the case of service companies, it should include a quotation module, filled in by the company's employee revealing the customer's problem and proposing a complex solution within a personal meeting. In the service sector, customers often turn to a

company that deals with just one section of their problem, but with discussion and consultancy, the service-company can offer a complex solution.

Search engine optimization (SEO) is nowadays the most basic online marketing tool. With the appropriate design of the website (content and form) and continuous link building, the service provider will be able to access the Google search results for relevant keyword searches.

To increase the visibility the company should also use Google Adwords ads. After testing the keywords, we would create Adwords campaigns that generate a high clickthrough rate. It's important that payment does not guarantee the first place, but it also defined by the relevance of the keywords and the quality of the landing page in addition to the quality of the ads.

Regular posting of newsletters can almost be considered as a form of content marketing, because the goal is the same generating attention and activity (clicks). It is all the more like content marketing, as direct sales promotion in the newsletter content is no longer practical. The target audience ignores this type of email, recognizing clear purchasing (service ordering) instructions.

That's why so important for a company applying inbound marketing in its marketing approach, attracting potential customers with useful expertise and being avaliable on relevant online interfaces. This method puts company services in the minds of future customers, but allows them to visit the website or ask for quotes when they want. [9].

Multichannel online presence is vital, and the service provider's professional role is enhanced by blogging, video production and participation in social media. Like content marketing, regular blogging also contributes to enhancing the company's image and improving the SEO search engine results, as every blog site is an indexed sub page in Google's search. Even in the case of blogging, Youtube and social media, the emphasis should be on regular, frequent and high quality communication.

It is a fact that today we 'live on mobile'. Mobile becomes personal media, wherever we are available, we can use countless features, customize it, enjoy the benefits of one-site content and services [10]. Online and offline environments affect purchasing decisions at the same time, so that our communication reaches the target group's knowledge and knowledge of current mobile trends is also important [11].

Mobile ads are virtually giving way to mobile applications so the service provider can gain a competitive advantage by developing an application through which its services can be ordered, or even assisted by promptly answering issues that occur in each phase.

Analyzing the company's market operation and communication, we conclude that today the service provider needs to pay more attention to implementing CSR

activities (social responsibility). The meaning of social responsibility is manifold: social sensitivity, environmental awareness, ethical behavior, respect for pure competition, equal opportunities, transparency [12].

The common forms of CSR activity are sponsoring and supporting events, but also in many areas the service provider can show how committed it is to the subject. The company's primary objective is to make the most in the field of environmental protection and sustainable development. Environmental protection, product safety and sustainable quality assurance are also an increasingly central part of company management. Other areas of CSR where the company can demonstrate its social commitment: support for education, organization of educational programs, scientific information (expert interviews in the media), publishing of a scientific journal, sponsorship of research and development, sponsorship of sports clubs, charity.

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Financial risks of microenterprises

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Abstract: Since the second half of the 19th century, the main drivers of the global economic development were the big enterprises and corporations due to their rapid growth and wide range of opportunities and potential. After a long time, it had been proven that micro-, small- and medium-sized enterprises or SMEs are indispensable participants of the modern market economy due to their flexibility and dynamic growth rate. My research and work is dealing with – the smallest participants of the SMEs – the microenterprises. Their importance is coming from their characteristics and from several other factors, among which perhaps the most valuable is their job creation capability. As in case of any business organization, microenterprises always have to face the various types and forms of risk. The main reasons for this process are the rapid changes in the economic environment and the increasing market competition and globalization. In my secondary research, I examined various financial risks arising during the operation of domestic microenterprises. In addition, – in the framework of my primary research – I made individual in-depth interviews with consultants, experts and leaders of micro-business segments of several Hungarian commercial banks about the supply side of the domestic money market. I consider as an important part of my research work, to formulate helpful suggestions and to explore and describe foreign and domestic good practices. By bringing these recommendations and advices back into practice, I try to help the microenterprises to find the potential ways for reducing financial risks and the favorable directions of development.

1 Introduction

Since the end of the 19th century, the main participants of the economic development were the large enterprises due to their big potential and opportunities. Soon, after the fragmentation of the Hungarian corporate structure, it had been proven that SME-s (Small and medium-sized enterprises) are important actors of the modern market economy. Among them, the micro-companies have a huge role because of their dynamic growth rate, flexibility and job creation capability. The day-to-day operation of these enterprises is constantly accompanied with various forms of risk. The possible causes are the strong competition, globalization and the fast-changing economic environment. These

risks can be divided into smaller groups: market, political, financial, human resource and territorial risks. My article is investigating the situation of Hungarian micro-enterprises and exploring their financial risks in today's rapidly changing economic environment.

In the beginning of my research, I formulated my objectives:

O1: search and evaluate the financial risks of the domestic micro-enterprises.

O2: examine opportunities for development and to formulate suggestions according to these.

O3: study the relationship between credit products and the microenterprises.

2   Secondary research

During the secondary research, I explored the domestic and EU microeconomic environment. First, I dealt with the proper enterprise classification, which main aspects are the total number of employees, the annual turnover and the balance sheet total. Thus, those organizations are micro-enterprises, that have less employees then 10 and have a maximum balance sheet total or turnover of 2 million euros and the corresponding forint amount. In this group, companies with 0 employees and private entrepreneurs are usually treated separately.

From the last report of the Central Statistical Office (CSO) we can see, that the total micro-enterprise proportion was determined at 97.8% in 2017. Based on the yearly statistics, we can conclude that the number of the Hungarian micro-enterprises is constantly growing, while the proportion of larger organizations is decreasing [5]. The huge role of micro-companies is also proven by the fact that around 10-12.5 thousand billion forints – almost one third – of the annual revenue in the SME sector is reached by them. The micro-enterprises are outstanding in the country's GDP as well. According to the CSO, 6.4 billion HUF – which is 35% – of the gross domestic product is produced by these enterprises. Thanks to their enormous number, more than 50% of the SME sector employees is working in micro-enterprises – which is more than 1 million people – and this ratio is steady during the years [4].

Recognizing their importance, the state started to support these organizations. This process includes various programs with solution for credit difficulties, changes in the legal, administrative and taxation system.

2.1 Micro-enterprises in the European Union

The internationalization of Hungarian micro-, small- and medium-sized enterprises is unique, because it took really short time and was difficult due to the developed EU market and its competitiveness. During the process micro-companies had to cope with the lack of capital and knowledge to build their business relationships and position. The average number of employees of domestic micros is like the European ones, but in case of export they have huge lag, because only 10% of them is dealing with export activities. The growth of the micro-enterprises could be accelerated if those larger organizations, that offer them supplier position, would raise their exports [6].

The huge administrative burdens and cost are also making the internationalization more difficult. Hungary is in the bottom third among the member states in case of the percentage administrative burdens relative to annual GDP, so it would be necessary to simplify and decrease these burdens [11]. So, we can conclude, that domestic SMEs are not in a good place in case of the international comparison. Most of them, does not even reach EU averages [2].

2.2 Financial risks and state programs

According to the technical approached risk definition: "The basic unit of risk is the average expected probability of occurrence of events that have a negative, undesirable impact on man and his environment." But there is no objective risk-perception, because the negative impact is subjective. In the economy, we use subjective utility: "unit expresses satisfaction or insufficiency in an event" and this way positive effects appear [10]. The risk itself has three main groups, which are strategic, operational and financial risks, among which I deal with the last. "Financial risk is essentially the value of the financial position due to the uncertainty of the future event" [3]. It is important to know all the emerging risk factors and the opportunities to eliminate these. In this article I mainly focus on the credit risks and the connecting bank credit products.

In recent years, big changes could have been perceived in the domestic economic structure. Since the fragmentation of large companies and the establishment of new micros, the number of SMEs grew radically. Since these enterprises do not have any antecedents and are often "forced companies", they have capital shortages and have to face financing difficulties. The greatest financial problems are due to the compulsory legislation, which have three groups: compliance, administrative and financial burdens. Among these the most serious difficulty is that the legislative changes are unpredictable. It is also a problem, that the sum of the administrative burdens can reach even 10% of the micro-enterprises' income.

Because of the constant shrinking of the bank lending and the high-risk level, it is hard for micro-companies to get any kind of credit form commercial banks. Even

in case of positive judgment, it is huge task for micros to pay the increasing amount of repayment and they easily get in a debt spiral [11]. The government has launched several programs to reduce these risks levels for banks, so they could give loans for worse-situated micro-enterprises. The most wide-spreaded programs are the Microcredit Program, the Growth Loan Program, the Szechenyi Enterprise Development Program, the Szechenyi Card and the MFB Points. The aim of these programs is to provides state cover, more favourable conditions and lower interest rates to promote the development of micro-enterprises.

3   Primary research

In order to complement my secondary research, I made 4 individual in-depth interviews with the representatives of domestic commercial banks to collect current and accurate data. My interviews were semi-structured, with open-questions and defined areas, so I could easily adapt my questions and the order to suit the partners' way of thinking. The conversations lasted 1.5-2 hours and the all data presenting in my work was discussed and approved by the interviewees. I refer to these conversations according to their numbers.

Table 1.: Interviews with the representatives of commercial banks

Number of interviews	Bank	Representative
1	K&H Bank	Leader of SME Segment Marketing Department
2	MKB Bank	Branch manager
3	CIB Bank	Small Business Segment Manager
4	Raiffeisen	Branch manager

Source: Own work

In this session I will briefly expound the issues covered during the interviews. Banks usually define micro-enterprises based on only the annual turnover. During the years, the number of micro-enterprises seriously increased, because of the currently low interest rates and favourable economic environment. These organizations mostly apply for a loan in forint currency with an average amount of 5 million forints and various maturity from 36 months till 7 years. Every commercial bank has its own, special products for micro-enterprises to attract and keep these companies. It is hard to make a general picture of these products, because of their specialities they differ bank by bank. Banks also have state credit offers, in this group the Growth Loan Program is the most common.

The process of the application and the judgement is unique in every commercial bank and according to this, the number and the form of the required documents and the platform also different. All of them try to use more and more online operations and opportunities to make the whole process easier for micro-enterprises. The loan disbursement period is depending on the special product but is generally between 1-4 weeks.

Because of the bank secrecy, some of my questions were only partially answered or remained without any response. These questions were about the proportion of positive and negative judgements and the causes of those. In case of the unsuccessful placements it is interesting, that the rate is really low, this can be due to the fact that banks are monitoring them after the positive judgement of credit application.

Despites all the efforts done by commercial banks, – to facilitate the application of micro-enterprises – a survey by OTP Bank involving 800 SMEs, did not show satisfying results. Only 33% of the participating micros use external financing possibilities. Lot of participants think, that they have to do so much paperwork, or their situation is not good enough, that is why they do not even try to apply [8].

4 Conclusion, suggestions

I consider it important, to formulate suggestions and to collect and explain good practices, through which I contribute to the development of micro-enterprises. By the help of these advices, the financial risks could have been decreased. Zoltan Szira professor also expressed, that positive entrepreneurial models should have been published through media surfaces, so micro-companies would easier find the most suitable solutions and opportunities [11].

One of the most serious problems of these organizations come from the usual and large volume changes in the legislation. The reduction of the information access and administrative costs could cause big decrease in the operating costs. Because of the lack of capacity, micro-enterprises could not follow these changes and could easily get into really bad situations. That is why an automated system should be built, which monitors these changes and gives information about them for the micros. This process might be united with the previous part, and good practice forums could get a part and role in this system.

It is a huge problem today, that most leaders of micro-enterprises do not see the huge potential in the knowledge investments. They do not want to change the routine and well-organized processes and if they do, often they have not got enough money for it. So, centrally organized trainings or lectures with low price could help these people a lot. Magdolna Csath economist thinks the same way and in her recent publication she pays attention to the development possibilities of

organizations. According to a study made by European Investment Bank, our country spends minimal amounts on knowledge investments. She states, that lately productivity could be better increased by the help of new techniques and innovations, which requires the raise of overall knowledge level. An opportunity for this could be the cooperation of higher educational institutions and micro-enterprises. Nowadays, this possibility is more suitable for larger organizations, so it is needed to develop and expand this opportunity by the help of the state. Through this cooperation, entrepreneurs and lecturers could have a chance to exchange and broaden their knowledge [7].

The Chamber should also contribute to these processes, as they could have handle tasks containing information collecting and transferring to the micro-enterprises and organization of educational opportunities or trainings. For this, various options are available like courses or online tutorials and news. It is also an option to cooperate with the local governments and make efforts jointly, as they are aware of the local needs.

SMEs have limited human and financial resources than larger companies, so it is significant for them to concentrate on innovation. Innovation is a main element of competitiveness also, thus companies need to properly set their priorities in this field to be successful in the long run. It can be stated, that in our country lot of competitiveness hindering factors appear during the operation of micro-enterprises. Therefore, the above-mentioned state and Chamber support is really needed to facilitate innovation and competitiveness [9].

Information serving and therefore advertisings are really important for commercial banks to attract potential customers. However, most of the advertisings are for private people not for companies. Thus, direct information flow would be necessary between them and micro-enterprises. This could manifest in the form of various presentations, where professionals could make the leaders feel that their products are easily accessible, and they should choose them [1].

Based on my whole research, I set the following hypothesises for my questionnaire, which is the next part of my work:

H1: The financial difficulties of micro-companies are basically due to the high costs of complying with compulsory legislation.
H2: There is no any direct forum available to micro-enterprises, which is dealing with the current market environment analyses and information.
H3: Because of the excessive documentation requirement, most micro-companies do not even try to claim any loans.

5 Summary

I believe, that exploring and analysing the hindering factors and the development potentials of the micro-sector is important to be able to make relevant conclusions and suggestions. During my research the supply side of the financial system got bigger role, that is why I am going to continue my work with a questionnaire to properly examine the demand side also.

Based on my research, it is clear, that micro-enterprises are indispensable actors of the domestic modern economy. But they need support to be able to fully take advantage of their dynamic growth rate and flexibility. This includes not only financing, but knowledge and professional support as well, both in national and county level.

I would like to share my results and formulated suggestions with the practical life to make the every-day operation of micro-enterprises easier. Among these, the organization of different forums – collecting the current information of the market and most important changes in the economy – is the most important and helpful.

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The challenges of an aging society - The topical issues of pension security

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Abstract: One of the most important social changes that threaten EU member states is the considerable aging of the population and its present and future impact on economies and pension security. Numerous studies prove that the state pension will not be enough to fully cover retirement spending. Maintaining a standard of living at the desired level requires some pension savings in addition to the state pension. This study consists of three parts. The first section presents the present and future trends of the population of the European Union on the basis of demographic and statistical data and their economic impact on state pensions. The second section presents the forms and possibilities of financial savings, with particular regard to pension savings. The third part presents the theoretical basis and the results of the research project "The role of self-care in our life".

Keywords: pension security, financial investments, retirement savings, behavioural economics

1 Introduction

The issue of aging has fascinated people throughout human history. Numerous famous philosophers, such as Plato[3], Aristotle[4], Cicero[5], Seneca[6], Petrarca[7],

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[3]   Plato on the first book of the republic: Cephalus talks about old age and money. According to Plato, harmonious old age is possible without material wealth.

[4]   Aristotle writes about the relationship between youth and old age, life, and death in the Soul philosophical studies. According to Aristotle, there is no harmonious old age without physical and material well-being.

[5]   In Cicero's Old Age, he writes that we must fight old age. you must fight against old age as against some disease. The most effective weapon against old age is exercising science and virtues.

[6]   Seneca's writes to Lucilius about beautiful old age and death in part XIV of Moral Letters. Seneca says you shouldn't be afraid of death and old age.

Cardano[8], Simone de Beauvoir[9] and others have studied and written about aging. We all desire a long and healthy life. We now live far longer than any time before in history. The EU is threatened by aging and aging has a considerable influence on economies and societies. Similarly, to other EU member states, Hungary's population is also aging, and as a result, Hungary faces various challenges, including the reform of the health system, the pension system, and the tax system. In the countries of Central and Eastern Europe, including in V4 countries (Hungary, Slovakia, Poland and the Czech Republic) the state pension system works on the Pay-As-You-Go (PAYG) principle (Fig. 1). In each country, preliminary calculations are done to ensure the sustainability of the pension system [12].

Country	First Tier			Second Tier								Third Tier	
	Mandatory, adequacy			Mandatory, savings								Voluntary, savings	
				Public pension schemes						Privat occupational schemes		Privat individual schemes	
				Financing		Type of pension				Status		Status	
	Basic	Minimum	Social assistance	PAYG	Pre-funded	Flat rate	DB	PS	NDC	Mandatory	Voluntary	Mandatory	Voluntary
Hungary (HU)		x		x			x						x
Slovak Republic (SK)		x		x				x				x	x
Poland (PL)		x		x	x				x		x		x
Czeh Republik (CZ)	x	x		x	x		x						x

Figure 1

A comparison of V4 pension systems (European Commission, 2018 and my own compilation)

The essence of the PAYG system is that the pension contribution of active workers is collected and distributed among the pensioners as pension [6]. In this system, the active workers pay for the pension of the pensioners. A great problem is that pension contributions are not capitalized, not invested [13]. Also, future pensions are not ensured, so all active workers can get is a promise that the state will provide for them when they are old. PAYG systems are in a crisis all over the world. State pension systems have to be reformed [2]. At the macro level, an automatic system should be created between contributions and benefits that

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Footnotes
[7] Petrarca writes in his secret book that all births and deaths are a new start and a possibility of closure to learning and experience. The stage between birth and death is life itself.

[8] Cardano was a practising doctor. In his book about his life, he deals with the issue of aging and describes the diseases of old age.

[9] Simone de Beauvoir maintains that almost everyone feelsd guilty about old people, and therefore the conspiracy of silence surrounds this topic. The purpose of his book is to break this silence.

ensures the long-term sustainability of the system [21]. The PAYG system is convenient while the population is growing [18].

2 The effect of aging on pension systems

Demographic data show that the population of Central and Eastern Europe (Fig. 2), including Hungary (Fig. 3) has been decreasing for some time and calculations show that it will continue to do so. The aging of the population questions the ability of societies to adapt to demographic changes. They have reacted to these challenges correctly because the traditional methods of aging are misleading and do not take into account the temporal and spatial differences in the characteristics of the people.
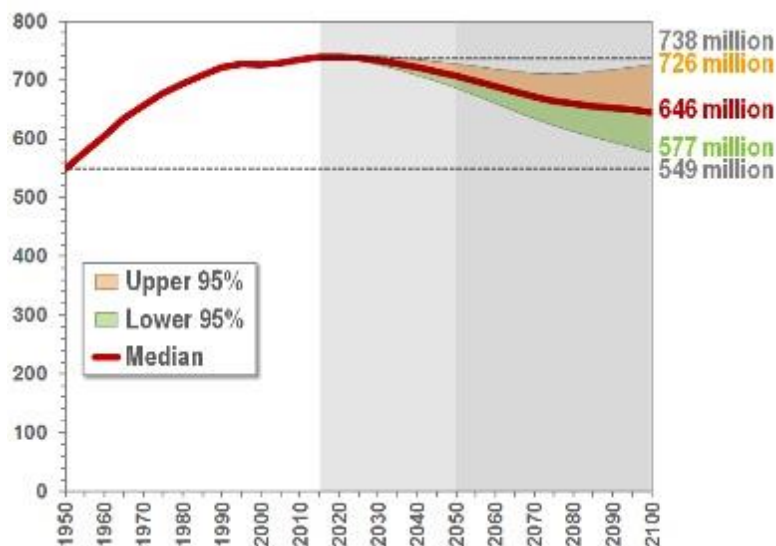

Figure 2

Population trends in Europe between 1950 and 2100 according to the baseline, low and high variation of population estimates (United Nations, 2015)

Today's people of 60 or 65 are very different form people of the same age half a century ago and are probably very different from people of the same age in half a century. People live longer and enjoy more knowledge.

million

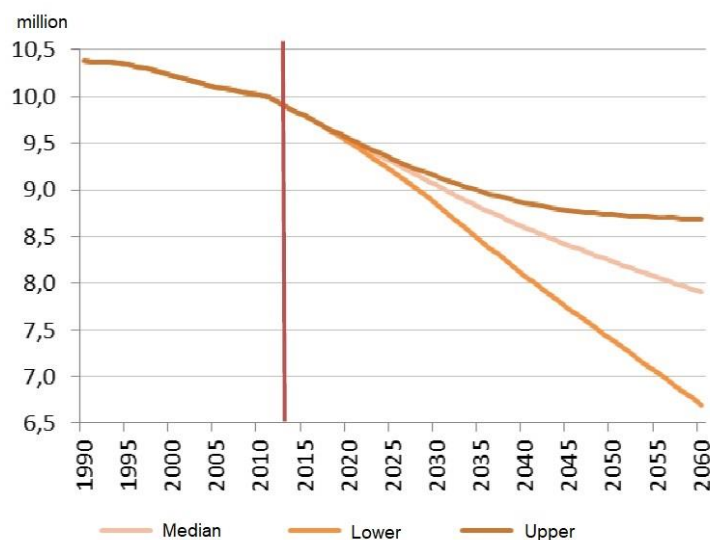|	
Median	Lower	Upper

Figure 3

Population trends in Hungary between 1990 and 2060 according to the baseline, low and high variation of population estimates (Hungarian Central Statistical Office, 2015)

Not only "40 is the new 30" but also "70 is the new 60". For this reason, aging in the 21st century can be better handled with tools of the 21st century.

• Aging is measured based on different characteristics, such as life expectancy, physical health, cognitive abilities etc. allowing a multidimensional description of aging. These new measures open new political perspectives in policy issues.

• How old do you have to be to be "old"? Commonly used old-age thresholds of 60 or 65-year-olds are different from the reality of people of longer life expectancy and better health. A better alternative is defining the shift of old age conforming to remaining life expectancy.

• More accurate measures of the aging of the population: The widely used indicators of aging, the ratio of old-age dependency and the median age of the population overestimate the rate of aging. We present this by comparing old measures with the "would be" counterparts, which adjust age groups to the differences of remaining life expectancy.

• A fair retirement age between the generations: fairness is a basic democratic value. A decent normal retirement age between generations can be calculated with the Characteristic approach, and it ensures that the balance of pension benefits and incomes is the same for each generation and that pension systems are flexible enough to adapt to demographic changes.

Then we present the measures of the aging of the population adapted to changes in life expectancy and compare them to the uncorrected measures. The uncorrected measurements of the aging of the population assume that old age starts at the age of 60 or 65. In this datasheet, we define the beginning of old age as the age when life expectancy drops to 15 years. This way a dynamic old-age threshold is obtained, which reflects the effects of demographic changes. The ratio of the population over the old-age threshold and the expected old-age dependency ratio is a measure based on two dynamic thresholds. In this datasheet, we measure aging with the new threshold value and compare it to the uncorrected values. With the help of the dynamic old-age threshold, new things can be seen. For example, here we show that the ratio of "old" 65-year-olds or older people is different in different countries and changes over time. According to the traditional approach, everybody over 65 is considered "old". It can also be seen that the ratio of adult age spent in old age decreases over time. Without correcting the changes of remaining life expectancy, it seems that people spend an increasing proportion of their adult life in old age. It is predicted that in the EU in 2050 the average life expectancy of women will be 88.2 years and that of men will be 85.7 years (see Table 1).

Table 1 EPC calculations for EU 27 and Hungary
(European Commission, 2018 and my own compilation)

	2016	2020	2030	2040	2050
EU 27 – Life expectancy for women {year}	83,7	84,3	85,7	87,0	88,2
HU – Life expectancy for women {year}	79,6	80,4	82,3	84,0	85,7
EU 27 - Life expectancy for men {year}	78,2	78,9	80,6	82,1	83.5
HU - Life expectancy for men {year}	72,8	73,7	76,0	78,2	80,3

On the other hand, births will only slightly increase and the number of people in employment will decrease greatly. As a result, pension expenditures will likely increase in all 27 member states of the EU. An important question is whether there will be enough active workers to cover pensions with their pension contributions (see Table 2).

Table 2 EPC calculations for EU 27 and Hungary
(European Commission, 2018 and my own compilation)

EU 27 – Number of births	1,55	1,61	1,67	1,71	1,74
HU - Number of births	1,48	1,61	1,68	1,72	1,75
EU 27 – Working-age population between 15-64 years {million}	290,697	287,478	275,374	262,255	252,854
HU - Working-age population between 15-64 years {million}	6,588	6,364	6,081	5,711	5,325
EU 27 – Potential growth of GDP	1,3	1,4	1,2	1,2	1,4
HU - Potential growth of GDP	1,9	1,9	2,1	1,2	1,5
EU 27 – pension expenditures {GDP %}	10,4	10,7	10,5	11,4	12,5
HU - pension expenditures {GDP % }	10,6	10,9	10,7	12,8	13,8

Pension experts already recognised around 1990 that the PAYG system could not be maintained in its current form for a long time, as population growth will slow down. They predicted that the number of births would stabilize at a lower level and fewer people would enter working age [2].
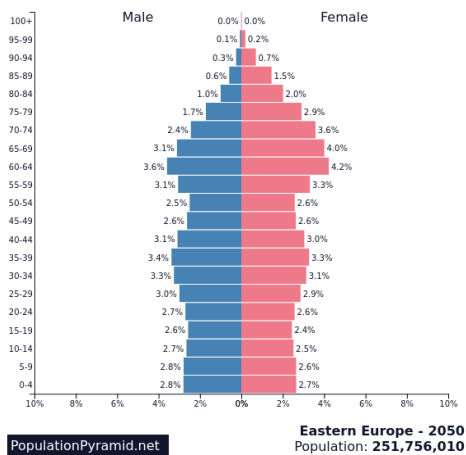
Figure 4 The population pyramid of Central and Eastern Europe and Hungary for 2050 (Population Pyramids, 2018)

The most important is to examine how the population changes, which makes accurate predictions for the future possible, for example what will the population and its composition of Hungary be in 2050. A closely connected issue is whether there will be enough active workers to provide for pensioners. The distribution of the population according to age can be seen in a population pyramid.
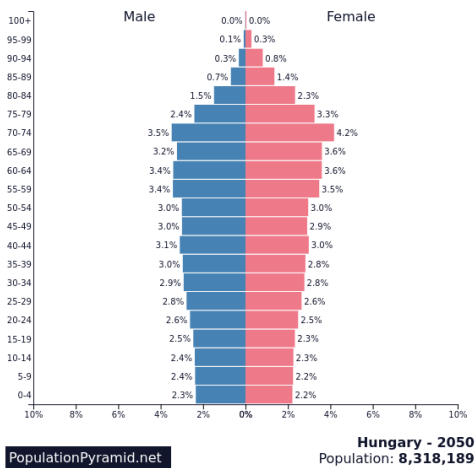

Figure 4 The population pyramid of Central and Eastern Europe and Hungary for 2050 (Population Pyramids, 2018)

The population pyramids in Fig. 4 and 5 show that by 2050 in Central and Eastern Europe and in Hungary, the number of young and middle-aged people will be

similar and the population pyramid only gets narrower at old age. It is predicted that not enough children and so there will not be enough workers so the ratio of workers and old people will not be satisfactory in Hungary in around 2040 (Fig. 7). Fig. 6 shows that the old-age dependency ratio grew to 29.9% in 2017. This shows the percentage of people over 64 related to the number of people aged 15-64. This means that there is one old person for every three active workers. Italy, Greece and Finland are in the worst situation. On the other hand, Luxembourg, Ireland and Slovakia has the best ratio. In Hungary the old-age dependency ratio has been growing steadily in the past years and last year it reached 27.9% according to Eurostat (at the beginning of 2018 it was near 29%). The ratio has grown in every EU member state in the past two decades, except in Luxembourg, where it decreased from 21.2% to 20.5%.
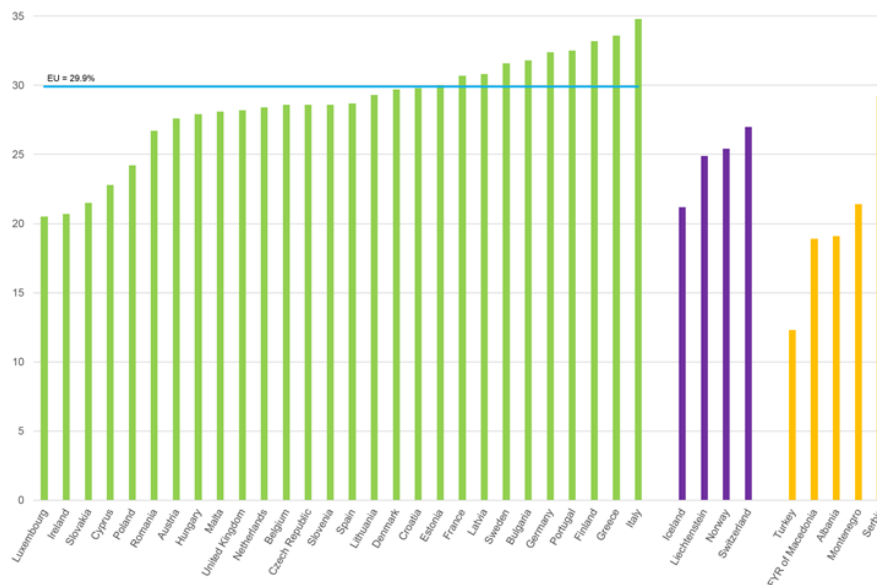

Figure 6 Old-age dependency ratio in the EU (2017, %) (Eurostat, 2017)

According to the prediction of KSH, the ratio of old and young people will change in the wrong direction because the number of old people will increase and the number of young people will decrease (see Fig. 7 and Table 3).
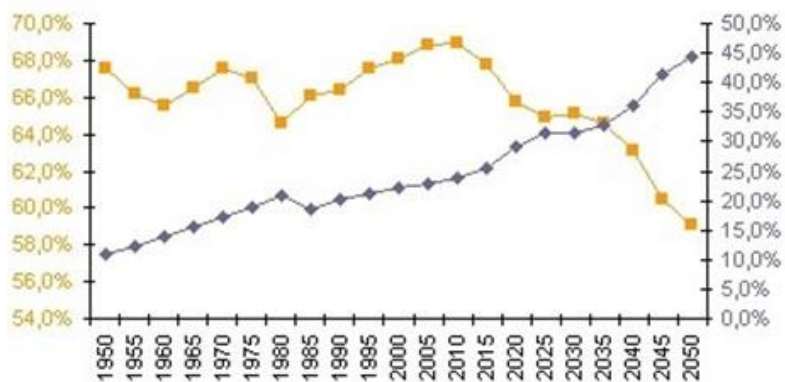
Figure 7 Old-age dependency rate in Hungary (KSH, 2017)

The basic principle of the PAYG system is that the working age population must be far larger than the pensioner population, otherwise the system collapses [11].

	1970	1980	1990	2000	2010	2020	2030	2040	2050
The proportion of pensioners and the working-age population	22.4	26.9	27.2	23.6	24.6	30.2	33.7	38.6	47.7

Table 3

The proportion of pensioners and the working-age population (KSH, 2015 and my own compilation)

Table 3 shows that while in 1970 one pensioner's pension was paid by nearly five workers, in 2050 one pension will be paid by approximately two workers [21].

3 An analysis of the sustainability of the state pension system

The Hungarian pension system currently has two pillars. Pillar I is the state pension system that works on the PAYG principle and pillar II is the funded system [13]. The PAYG system is convenient while the economy is growing [18].

The EU published its report on the population of EU member states on Eurostat. Hungary's population was 2.1% of the population of the EU in 1995 and only 1.9% in 2015. Many other countries are also 2%, including Sweden, Austria, Bulgaria, Denmark, Finland and others. All the people in these countries under 2% amount to no more than 14% of the population of the EU. The report states that development was fuelled by migration.

* Less than 2% each: Hungary, Sweden, Austria, Bulgaria, Denmark, Finland, Slovakia, Ireland, Croatia, Lithuania, Slovenia, Latvia, Estonia, Cyprus, Luxembourg, Malta.
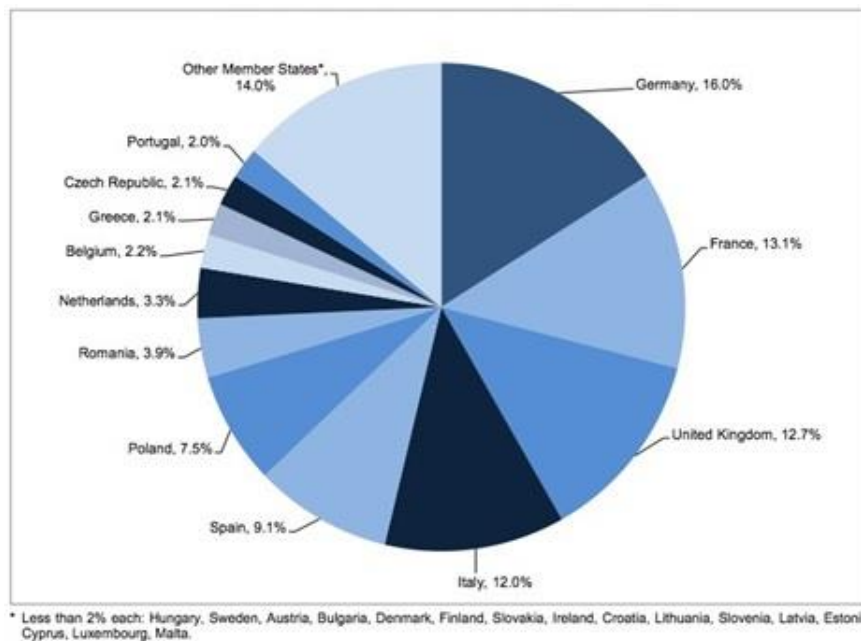
Figure 7 The population of EU member states as a proportion of the whole population of the EU
(Eurostat, 2015)

For the sustainability of the state pension system, the simplified mathematical model of the PAYG system needs to be examined [21][3]:

$$AxBxC=DxE$$

A: number of contribution payers

B: pension contribution rate

C: yearly average salary

D: number of pensioners

E: annual average pension

The number of pensioners is predicted to increase drastically—this cannot be changed. The right side will increase and the balance will be upset. How can it be reset?

- Increasing the number of people paying pension contributions: this number is not predicted to increase; it is likely to decrease. A solution could be to motivate young people to have more children.

- Increasing the pension contribution rate: it would be even more tax for employers and employees.

- Increasing the yearly salary: it cannot be increased much as productivity is low in Hungary.

- Decreasing pensions: pensions are low as they are, and further decreasing them would make the ruling party very unpopular, which no party would risk.

- Another possibility is raising the age of pension eligibility—it was suggested and introduced in many countries (Fig. 8). The Finnish Centre for Pensions collected current European retirement ages and also their planned increases. Except for Sweden and Norway, retirement age can be over 64 everywhere and in some countries, it may exceed 70 years. In Hungary, the retirement age is currently being raised gradually, over several years (the retirement age of 65 will be universal in Hungary by 2022). It may, however happen that in 5–10 years, retirement age will have to be raised again —first to 67 years, then in a relative way, connected to life expectancy at birth.

Under 65: Sweden, Norway
65–66 : Estonia, Bulgaria, Austria, Latvia, Lithuania, Luxembourg,
        Malta, Romania, Slovenia, Hungary, Switzerland, Poland
66–67 : Belgium, Spain, Croatia, France, Germany, Slovakia
67–68 : Finland, the Czech Republic
68–69 : Cyprus, Ireland, Great Britain, Portugal
69–70 : Italy
70–71 : Greece, Iceland
71–72 : the Netherlands
72 –   : Denmark
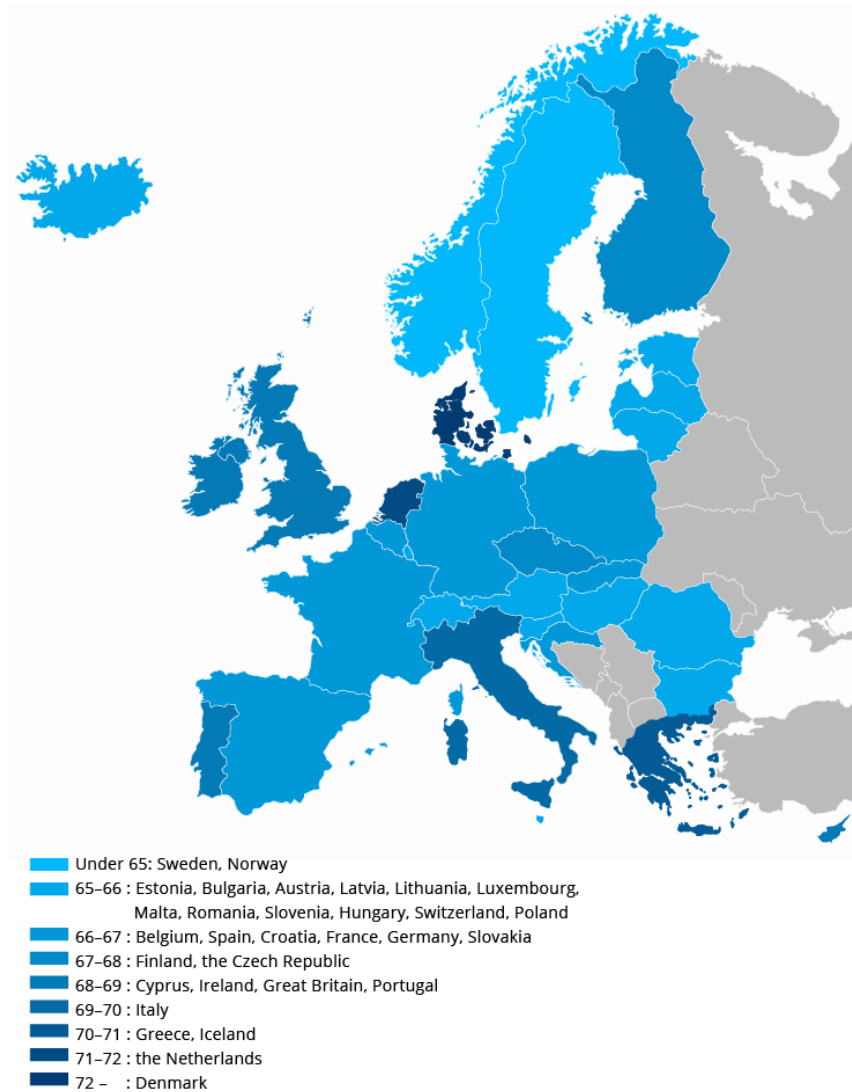
Figure 8 Retirement age in the EU in 2050 (Finnish Centre for Pensions, 2017)

Wherever the formula is modified, the system will become imbalanced. The two sides need to be balanced macroeconomically. Therefore, experts recommend a mixed system. In the current pension system, a supplementary element can be a voluntary pension fund. This can help sustain after retirement the standard of living one got used to in one's active years. Other pension saving systems include pension insurance.

4 Financial saving forms and possibilities

In addition to increasing pension contribution and tax, and retirement age, there is a more effective and sustainable solution: self-care. This means that people create their own private pension fund, which will enable them to live a full life in old age. This relieves the state too because they save money privately, albeit with state help, and they manage their own wealth. There are many forms of savings (e. g. voluntary pension fund, pension savings account and pension insurance). When choosing the right savings product, one must decide how important the term (time period) and liquidity are.

The Hungarian state supports three different pension savings schemes via income tax deduction, with support up to 130–150 thousand HUF annually (depending on yearly contribution). These are: voluntary pension fund, pension savings account (NYESZ) and pension insurance. Planning for at least 10–20 years ahead is recommended with these schemes. The accumulated private capital can be accessed when retirement age is reached (with special conditions they can be accessed earlier, too). The question is, however, which retirement age should be considered: the current or the future one? Of the three possibilities only pension insurance has a fixed retirement age, so if this is chosen, one does not have to worry about future changes. In the case of the other two, it is possible that the money can only be accessed at the age of 67–70 (if the retirement age is raised). The savings schemes in detail:

1. Voluntary pension fund (OPT): The members pay contributions to the fund regularly and at retirement age, they receive different services from the fund. Unlike state pension, pension payments are funded by the members' contributions and their interest. Membership and contributions are voluntary. The contributions can be different amounts must be at least 2000 Ft monthly. A voluntary pension fund can be used to accumulate wealth for other purposes than pension. Voluntary pension funds are excellent long-term investments because the state gives considerable tax relief after contributions.

2. Pension savings account (NYESZ): It is a supplementary element of the Hungarian pension system. People that have a pension savings account can choose the securities the money is invested in (shares, bonds, or investment fund shares). At the moment, this is the only form of pension savings where the individual gets state support, and can also decide the type of investment to be used.

3. Life insurance: In everyday use, life insurance is connected to events in the person's life: usually death but it can also be disability, operations, serious illnesses, permanent damage to health, incapacity or other event specified in the contract (reaching a certain age, wedding, having a child, retirement etc.)

5 The role of self-care in our decisions

5.1   Behavioural economics and decision-making typology

Self-care means pension savings (voluntary pension fund, insurance, other savings etc.). It is not easy do decide which we would like to provide for us in retirement. Decisions, for example "what investment form to choose" generally cannot be predicted based on reason or preferences because they are overwritten by other, non-rational factors [9]. Research shows that the processing rational and irrational information is in connection with the hemispheres of the brain. The left hemisphere is conscious, dominant, logical, rational, analysing and thinks positively; the right hemisphere is associated with the subconscious—irrational, emotional and negative thinking. The positive or negative way of processing information is a stable personality trait but it can be influenced [9]. In most people, the dominant hemisphere is the left hemisphere, which is characterized by positive information processing [9]. It is positive because it hopes for a favourable outcome of situations, and so it does not tolerate crisis situations well as these threaten its positive expectations. The left hemisphere is characterized by analytical thinking, research and making lists. The right hemisphere is better suited to process negative information, that is, it plays with the expected outcomes in a given situation, imagines the outcomes therefore it is mostly activated in a given situation. From an economics point of view, it is important that research has shown that it is the right hemisphere that determines individual preferences. In problem solving, the right hemisphere collects experience about the individual outcomes. Decision making therefore is greatly influenced by which hemisphere the individual depends on more. Another determining factor of decision-making is the decisiveness of the decision maker. A decisive person makes decisions faster than an indecisive person. Based on decisiveness and use of the hemispheres four types of decision making style can be differentiated.

5.2   The role of financial awareness in decisions

The research focused on the present and future state of the respondents. We wish to know what motivated them to choose self-care, what customs and processes influenced them to choose the pension system they chose. We used a questionnaire and examined the respondents using behavioural economics and factor analysis to see what decisions we can make about the possible future pension. The research examines the role of self-care as a supplementary pillar to state pension in public awareness and in our decisions, what pension system the respondents think is desirable in the future, what will the pension of the future generations include, and the number of people who will work in the future and

how they will work. The research assumes that people think about pension with fear and uncertainty.

As mentioned earlier, the PAYG system is in a crisis, therefore the second pillar of the pension system, self-care receives more and more attention. To understand the motivations behind the decisions of the respondents more deeply [10], I used factor analysis, which is widely used nowadays to map personality (Otto, 2003). I used the SPSS software to process the questionnaire data with help from the department [17]. The online survey was carried out in 2017. The respondents gave their answers online on kerdoivem.hu (link: http://www.kerdoivem.hu/kerdoiv/927511662/). There were a total of 500 respondents (n=500). My basic questions were connected to the planning of pension systems, forms of pension savings and self-care, pension security because these elements determine the financial background of our future existence, that is, the degree of self-care. The answers were divided into three groups: 1. Knowledge of pension systems (mandatory, voluntary); 2. Financial planning (characteristics of various kinds of savings); 3. The role of self-care (mapping the personality). The qualitative research analyses the above three groups separately. We calculated several statistical characteristics, for example average and frequency, and also carried out cross tabulation analysis. This paper only focuses on state pension and the role of self-care.

			PENSION SAVINGS		Total
			Male	Female	
OPTIMIST	Yes	Number	324	12	336
		% OPTIMIST	96,4%	3,6%	100,0%
		% PENSION SAVINGS	67,4%	63,2%	67,2%
		% Total	64,8%	2,4%	67,2%
	No	Number	157	7	164
		% OPTIMIST	95,7%	4,3%	100,0%
		% PENSION SAVINGS	32,6%	36,8%	32,8%
		% Total	31,4%	1,4%	32,8%
Total		Number	481	19	500
		% OPTIMIST	96,2%	3,8%	100,0%
		% PENSION SAVINGS	100,0%	100,0%	100,0%
		% Total	96,2%	3,8%	100,0%

Table 4 The role of optimism in pension savings (my own compilation)

The answers show that the respondents are basically informed about the pension system. 92.2% of respondents do not think the current state pension system is stable. They trust pension savings more - 65.2% of the respondents answered yes

to this question. Only 15.6% have pension insurance. The results show that savings are important to the respondents. Pension savings according to age - People of 29-48 years of age consider pension savings important [22]. Table 4 shows further relationships between pension savings and optimism.Relationships between pension savings and optimism. Optimist men regard pension savings more important than optimist women do (shown by the higher number of 324 yes responses). Generally speaking, respondents are most encouraged by the general economic situation and security at work, and the pension and health insurance systems in the future country.

Conlusion

The population of a country changes only slowly from year to year, and the characteristics of demographic processes are drawn up over a longer period. However, the factors influencing population change are well predictable as a result of the laws of each sub-process. According to forecasts, current pension systems are likely to cause severe social and economic problems globally because of the rapid ageing of our societies. Based on forecasts, the current pension regime, and the drastic change in the ratio between active wage earners and pensioners will, with a high degree of probability, cause social, economic and other problems in the future both globally and in our country. The Hungarian mandatory pension system is a pure pay-as-you-go state pension system. It covers all persons who are engaged in any kind of employment as well as recipients of unemployment and certain child care benefits. This is a defined-benefit PAYG system with an earnings related public pension. The old-age pension is the most important source of income for the elderly. However, in order for the amount of the pension to be of an adequate standard, it is usually not enough to meet the requirements for the minimum period of insurance required by national legislation. The longer the insurance period, the higher the amount of benefit the person can expect. Experts recommend a mixed system but currently there is no universally accepted concept. Despite the small number of answers, there are many possibilities. The respondents consider many possibilities to ensure their future living. State pension is mandatory so there is no choice about it. Concerning supplementary possibilities, like voluntary pension funds and private investments, income and emotional decisions determine which form or forms are chosen. Of course, research can not solve all the problems of the pension system but researchers can clearly define and examine possibilities and effective methods for prediction and problem-solving.

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Opportunities and Challenges for the Marketing of Organic Products in Szeklerland

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Abstract: At present, the demand for organic products in the Szekler region is very low, partly because of the high price of products on the market, and the lack of knowledge about these products on the other hand. Based on preliminary experiences, interviews with organic farmers and the analysis of the market situation of traditional products and local foods, it can be said that some of the biggest challenges facing new products entering the market are their sale and marketing. Despite the fact that product development is successful, distribution channels, and messages targeting customers are inadequate. The aim of the study was to identify the marketing tools that could promote the sale of organic products in this region.

1 Introduction

Bio-agriculture, the production of organic products is still in it's infancy in Szeklerland and the surrounding region, very few people are actively involved in such activities, though there are already some initiatives, some subsidy programs that support the development of such agriculture in this region aswell.

However, it's not enough to focus only on the technologies and skills necessary for the development of organic products. The current low demand for such products in the region needs to be addressed aswell, which is due on one hand to the high prices of products already on the market, on the other hand also to the lack of information about such products [6]. Currently, the price of locally produced organic products is approx. 20% higher than average products, but still competitive with imported organic products. Approx. 70% of organic products produced in the country is exported, mainly because it is difficult to sell it at local markets.

According to our prior research [1][2][3] and field experience as well as the market analysis of traditional products and local food products [7], the biggest challenge facing new products entering the market is their sales. Successful product development alone does not suffice without proper distribution channels

and properly targeted communication. It is no novelty to anyone anymore that high quality products can miss their success if their customers are not sufficiently informed about them or if the product fails to reach them in a desired manner.

With respect to organic products, their proper marketing is especially important since there are multiple factors complicating the process. Higher prices and specific added value such as health- or environmental consciousness already decrease the number of potential buyers, while at the same time there is a general lack of information about these products.

Businesses active in organic farming tend to be small, family-run farms that lack the neccesary commercial background. Finding the proper sales outlets can also prove to be difficult. It is for these reasons that it's worthwhile to focus, beside the production and certification of products, also on marketing activities. Although organic farmers have an interest in the development and strengthening of these processes, the development and successful operation of these outweigh the potencial of individual farmers. This problem requires a strategic activity of regional professional / institutional actors. [4]

2 The application of marketing tools in the sales of organic products:

As conclusioned by the Greenfood[10] project, the most beneficial situation for small producers as well as for customers is if distribution channels shorten and middlemen are left out. This can lower prices for customers as well as raise margins for producers. The possibility of selling on close-by, local markets can also lower transport costs that can have a great influence on final price.

The tools of marketing can be applied even in this small sector, from market segmentation, definition of target groups to product positioning.

The defining, identifying and analysing of customers is one of the most important key elements of marketing. So as to be able to effectively reach, communicate to and influence customers in their buying decisions, we need to get to know their expectations, their needs and buying habits.

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[10] A biotermekek forgalmazasa es marketingje - GREENFOOD PROJECT 2010-1-ES1-LEO05-20948
http://projects.ifes.es/porqualLeonardo/do/get/binary/2013/02/application/pdf/A_BIOTERMEKEK_FORGALMAZASA_ES_MARKETINGJE.pdf.

Currently, the group of customers of organic products is very small in the region, due to multiple causes such as the scarcity of information that has been spread about these products, the lack of knowledge about their added values, but also due to the small number of organic products available on the market, as well as the high price these products command as they are mostly imported goods - local organic products are near impossible to find.

During the definition of potential customers of organic products it is important to take note of factors such as the generally higher environmental- and health awareness of people who buy such products. Energy efficiency, selective waste collection, restrained eating habits, focus on health are all traits that are frequently shared by the members of this group. This is currently still a very small segment in Szeklerland, however the gradual, albeit slow penetration of the latest lifestyle and nutrition trends into the region will see this group rise in numbers here aswell.

At the same time it is important to note that there are specific medical conditions or diseases that require, or at least benefit from the consumption of organic products (allergies, intolerances, etc.). These conditions are becoming more prevalent in recent years, meaning that not only people already diagnosed with them can be potential customers but also individuals focused on prevention.

The strive for an aware lifestyle is on the rise in this region aswell, though still mainly characteristic to the urban, better educated population of young adults who dispose of higher incomes. The purchase of organic products is clearly still only affordable to people with high incomes. The current situations highlights that even in the case of customers who have a need for such products, the price is still a limiting factor.

Based on this information we can outline two main tasks that, by taking into account the situation and needs of local customers, could improve the sales of local organic products on local markets:

- Prices of locally produced organic products could decrease significantly compared to imported ones, if middlemen can be eliminated from the supply chain or their number decreased. This however requires that producers get in direct contact with the final customer.

- The number of potential buyers can be constantly increased by actively disseminating information. In the case of organic products, one of the main tasks of marketing communication is the emphasis of the unique values of eco products. Why they are different to other, high quality products. It is important to underline their social value, their role in environmental protection, sustainability, animal welfare, as well as describing the technological processes that differentiate the production of these products

from competitors. These activities of informing the public however are not the sole tasks of the producers any more, but should rather develop into a common cause advancing the development of the whole sector.

3 Sales opportunities for organic farmers:

Direct marketing is one of the most effective form of sale for organic products, that is establishing direct contact between producer and customer. This form is best suited to building customer trust. When purchasing these kinds of products, besides their quality, customers are also interested in learning about the production process, origin of the product, as well as the person behind it. A direct, personal relationship affords opportunities to obtain these pieces of information and learn about the products. This however requires that the producer assume a role not only in the production process, but also in the distribution of their products. This also leads to a shortening of the supply chain, bringing multiple benefits - yet another reason to evaluate this opportunity:

- A reduction in the number of middlemen (retail and wholesale) leads to a reduction is commercial costs.

- By the way of a personal relationship, customers gain much more information, leading to them having a better knowledge about these products.

- Products become much more affordable.

- Can lead to social and environmental effects such as sustaining the ecosystem and regional development.

The simplest and most obvious form of establishing a personal sales relationship is through partaking in local fairs and markets. This form of sales has numerous advantages, since it affords a stability and permanence both to the customer and to the producer (products are permanently available to the customers, while the producer can count on forming a stable group of clients thus guaranteeing the sale of his products), the products remain easily controllable as to their quality, while the personal rapport also affords an easy channel of market research to producers to further understand their customers, their needs and expectations, while saving costs needed for the development of sales channels. The only potential downside of partaking in local fairs and markets are their fixed schedules, thus forcing the producers to adapt to them.

Local markets are suited especially to the sale of fresh goods, although we can see processed goods ever more often.

Another form of direct marketing is selling at the point of production. This can imply greater costs if there is a need to create a suitable retail space for this activity. This form is advantageous for producers since they can sell products locally, saving transport costs. One disadvantage however is the necessity to convince customers to buy directly at the producer. This implies the creation of a constant, loyal base of customers that are not only casual buyers but who are committed. This form of marketing is suited especially to small settlements.

Should it be impossible (or not justifiable) to create a suitable retail space in-house, a possible alternative is a packet/pick-up system, which implies the customers picking up their orders directly from the producer, or having them delivered (implies transport costs that need to be taken into account).

Exclusively doing sales in person however can restrict expansion at some point and can even hinder producers in their development, so analyzing alternative sales channels that can help expand the market reach may be worthwhile.

One such alternative is the establishment of local, producer's organic shops or entry into already established bio-shops.

The creation of producer's cooperatives can also be beneficial, since they can potentially ensure the sales of products and exert control over prices.

Sales can target besides individuals also institutions or hospitality. This offers the benefit of selling larger volumes while also ensuring demand.

The rise of new technologies affords opportunities such as e-commerce, the sale of products in online. This presents the producers of organic products with the possibility to create their own online shops where they can cater to consumers or other businesses directly, but also to create shared online shops. A common virtual platform where more than one producer can share their products can turn out to be a very effective tool. For one, they can reach their customers more easily (consumers of organic products tend to be a well defined group) online, while also lowering marketing and communications costs as these are shared between all sellers. One possibility of running these online shops is through cooperatives. Even this way, costs with distribution are kept low.

4 Marketing and communication tasks for organic farmers:

As mentioned earlier, one of the most important tasks in this regard is the education and proper information of potential customers about the added value of organic products. Also, winning and maintaining the trust and loyalty of existing customers as well as brand building, which is essential to being able to compete with other quality products on the market.

It is advised to keep some aspects in mind throughout the branding process, such as:

- Is the producer producing one or more products?
- Are these products part of the same family?
- Are they selling fresh or processed products?
- The place and characteristics of the sale process (direct or indirect, shared or private)

Branding is important to producers as it allows them to differentiate themselves towards customers, so as to allow them to be easily identifiable on the market. A brand helps customers find what they are looking for, and even if competition is not particularly stiff, there is a need to use certain elements that define the traits of the product. A well built brand means safety, trust, quality. It communicates everything we wish to project about a product (in this case such as the added value of a product). Branding however doesn't stop with an attractive logo, name, slogan and maybe high quality packaging. For one, all these need to be used in a consequent and constant manner, but they also need to be paired with messages that we want to be associated with the products and the brand on the long term.

Depending on the number, nature and sales method of the products, one can use individual brands or a common brand, maybe an umbrella brand that encompasses more than one product family.

When speaking of marketing communication, most people associate it with classical advertising (tv, radio, print ads), however in the marketing of organic products, owing to the nature of the products as well as the specifics of the target group, these traditional channels prove to be less effective.

The emphasis here is on rational persuasion and the building of trust, both of which can be much more easily achieved through non-traditional advertising: personal sales, markets, fairs, exhibitions, advertising at the point of sale or the use of web 2.0 elements in the online space (social media, blogs, online shops).

One of the biggest advantages of these channels, besides building a more personal connection, is their lower cost.

Due to their high costs, traditional forms of advertising can only be effective if producers use shared advertising. For the advertising of a larger, shared online shop or of an umbrella brand, traditional mass-media is effective.

However, communication for organic products does not simply target direct sales, there is a need for market expansion here aswell, to be able to address new customers and to shape customer needs. To this end, mass communication tools can prove to be more effective. On the one hand it is worthwhile to support and promote a health- and environmentally conscious lifestyle, emphasizing their beneficial effects (besides private gains also their social and commercial benefits). On the other hand, if distribution channels can be shortened, the shrinking prices may result in the products becoming more affordable, something that customers need to be made aware of: organic products do not need to be in the realm of the unaffordable.

The promotion of organic products and the technologies behind them is a common cause that should be addressed not by individual producers but jointly, with the help of professional guidance and consulting. Best of all would be if these tasks were to be undertaken by a third party, who could create the neccesary awareness for this sector through guided, consequent communication so as to be able to consolidate continuing support.

Conclusion

The application of organic farming can present an extraordinary opportunity to small producers, however it need to be emphasized, that besides the production process, sales present an equal challenge. Therefore it is advised, that producers attend educational activities, workshops and presentations not only about the technologies involved in the production process, but also about elementary commercial and marketing skills. This way, marketing and sales activities will be much more manageable to them as well, helping them decide on the proper commercial practices suited to their business.

Organic farming can in time become a sector that presents opportunities not only to producers, but to the financial development of the whole region and the increase of its competitiveness, provided the sector can develop and strengthen properly. However, theoretical support and guidance is not enough, as we are talking about an emerging sector, the actors of which may prove to not be financially and politically strong enough for the time being. For their consolidation, there is a need for an inclusive, supportive organization the main goal of which would be the promotion, dissemination and maybe even financial aid of this activity.

For small producers, even if they succeed in promoting and selling their own products, the task of promoting and communicating the benefits of the whole organic farming process may prove to be too much. At the same time we need to emphasize that the launching of many such activities in parallel tends to have a stifling, rather than amplifying effect on each other. For this reason there is a need for a centralized body that could fill this role. Besides creating new demand for these products through promotion and information and by positioning organic products alongside locally available products, this body could also help in securing support for the sector.

This kind of support can help producers reach long term financial stability, but can also contribute to the development of the region, since it could ensure the prospering of this still emerging sector.

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A comprehensive analysis of generation-specific characteristics of investments to increase the level of employment

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Abstract: The theoretical background of this study has three main bases: the service aspect approach of investments, the current challenges for generational marketing and employment. Among the investments, in the study we were focus on the segment of the construction sector, because we have many years of empirical experience in this field. We analyze the investment as a service project, primarily as a risk factor from the client and the contractor side. The other theoretical pillar of this study is generational marketing, with the focus of my research being on the potential of the young generation as a future market for the customers and contractors of the investments. Our goal is to determine what special risk perception and risk taking characterizes different generations. In this study, we introduce partial results of a research project, which was made with the support of the New National Excellence Programme (code: UNKP-17-4) of the Ministry of Human Resources. The study also deals with the current challenges of domestic employment, in the sense that construction investment provides an excellent opportunity for the varying employment options of various generations and thus contributes to increasing the economy's performance. The study presents primary and secondary research results, in the latter using qualitative and quantitative techniques. The results can be relevant to investors in construction as well as to the customers of investment by raising awareness.

Keywords: employer branding, generation marketing, Z generation, primary qualitative research, investment project management

1 Intruduction

The relationship between economic performance and labor demand is well known. According to the traditional economic approach, economists examine labor income on the basis of real wages, in other words, they look at the purchasing power of an hourly wage. In the production of national emissions, labor demand

determines the marginal productivity of work. The mechanism of competitive wage levels and the marginal productivity of work is well known. The quality of work as a production factor also influences the overall wage level: as the skills and expertise of the workforce evolve, labor productivity increases. On the basis of international comparisons, according to traditional considerations, factors defining labor supply are influenced by working time, activity rate and immigration.

Therefore, our research aims not only to achieve the performance improvement of enterprises by changing more or better capital resources operated by the workers, but also to take into account other factors that have not been studied before.

In our view, this image is much more complex, and we have categorized employee preferences by looking at employee aspects, and looking at what the employees' aspects are when choosing a company, and then we recommend incorporating these factors into the marketing strategy of the enterprise during employment branding. As we know the competitive pay is not enough, as there are many demotivating factors in a company, for example over-regulated corporate bureaucracy, inappropriate office temperature, and lack of individual improvement [1] [2] [3]. The brand would mean advantage in food sector too if the members of Z generation would know the main characteristics of brands [7] [8].

During the examination of the current Hungarian labour market, it can be seen that the quantitative and qualitative composition of the workforce is becoming more and more problematic. The problem is not unique. It can be seen all around Europe [6] [9]. This problem emerges as an absolute obstacle to corporate growth and the development of investments. Different age groups, different preferences and different corporate strategies are required in the selection process [10] [11] [12]. The recovery of investments has an absolute positive impact on the economy. As during the economic crisis in 2008, the downturn in the investment sector had a direct negative impact on the performance of the economies, the currently perceptible positive change has the same effect, but with the opposite sign.

In this present study, we demonstrate the partial results of the second phase of a research project.

Within the frame of this two-phased project, we analyse the factors influencing the career and workplace selection of generation Z, via qualitative and quantitative techniques. Our objective is to be able to provide a certain guideline for employers focusing (also) on generation Z, which will contribute to the definition of the milestones of a target group oriented employer branding strategy.

In the first phase of the research project we have conducted a qualitative analyses via thirty mini focus-interviews with a semi-structured interview guide.

Interviews were audio recorded. The results were processed with the help of regular content analysis methods [4] [5].

In the second phase, the qualitative survey has been implemented. Again, the non-representative snowball method was applied during the sampling process, and we have recruited respondents with filter criteria regarding their age.

In this present study we aspire to demonstrate the partial results of the qualitative phases, focusing on the requirements and ideas concerning to a successful carrier from the aspect of the generation "Z".

2 Methodology

Beside secondary research the application of qualitative technique in the frame of an empirical investigation, with a semi-structured individual interview sketch (GUIDE).

Within the frame of this two-phased project the topics of the semi-structured interview sketch were the followings:

In the first phase of the research project we have conducted a qualitative analyses via thirty mini focus-interviews with a semi-structured interview guide by two focus. Primary approach: What is the opinion of this age group on career, success, and preferred and undesirable workplaces?

What is the importance of a career and success in work, and what are the factors that help them most in the realization of their individual goals?

What do they expect from a good workplace? What kind of activities, programs offered by the employer would suit this target group best?

What kind of generational problems does this age group see, perceive? How open are they towards working together with other generations, what are the advantages, disadvantages they feel and experience?

Secondary approach: Processes, the phases of work (through a random access example)

Systematization of the tasks (establishment of connections, selection, obtaining of commission, course of agreement, proposal, work processes, documentation, supplementary or additional work)

Systematization of work processes on time (chronology, duration, separate pitfalls of the phases and their effects)

Preparation of execution (separation of roles of investor, designer and contractor)

Financial matters (size of the budget, fees and realization)

In the second phase, the qualitative survey has been implemented. We also analyse the factors influencing the career and workplace selection of generation Z, and the

investment projekt management, via qualitative and quantitative techniques. Our goal is to provide guidance to the Z-generation employers, which will help to identify the steps of the target-oriented employer branding strategy, and to guide the direction of investment development.

3 Results

3.1   Results of the research interview

Based on the primary research it can be said that the subjects of the sample see a successful solution to market challenges in mutual cooperation. In this context, the interests of companies representing educational institutions, professional organizations and the employers need to be coordinated.

Primary approach result is, on the road to the X generation, representatives of the corporate sector have highlighted the role in education. In a rapidly evolving and increasingly specialized technological environment, companies need to take an active role in education so that they can get in touch with the potential targeting group from those specially interested. As a result of trends in the industry, a significant part of the specific jobs will be transformed in the future, and HR professionals will have to prepare their own colleagues. This is especially suitable for internal trainings, further training and specialization.

Generational differences are also challenging. From the employer's point of view, adaptation to different generational needs requires flexibility. It requires recognition of the HR and HR communication tools to be tailored to the specific workforce.

The employer's brand has a well-positioned value, message and mission, which plays an especially important role in increasing the loyalty of young people (Y and Z generations). So, it is not surprising that we are seeing more and more positive examples of successful, trendy employer branding. In our opinion the significance and role of these activities will continue to grow in the coming years, in the intense battle for talents.

Secondary approach result is, in the course of our research, we segmented the risks of construction and recovery projects, and I looked at their relationship with the willingness to work in the different gestures. In the first step, I identified the risks associated with the project (during preventive research) and their importance as investors.

On the basis of the results, the respondents are of high quality (poor quality materials, inadequate work), reliability (how many tasks, professional

responsibility and compliance with promised deadlines), and financial risk (investment coverage, sufficient). This money was the completion of the works), which were the most important aspects of the investors.

Table 1.Detected Risks

Detected Risks
problem solving by a specialist
trustworthiness of the specialist (how many tasks, responsibilities and compliance with the promised deadlines)
the quality of the work done (poor quality materials, inadequate work)
investment cover (enough money to finish the job)

Source: own research

Based on the results of the focus groups, the previous risks were identified, and these risk groups appeared generally in the case of projects, in almost all groups, ie they did not show generation-specific tickets.

4 Conclusions and suggestions

We strive to learn by our future quantitative research the following:

What kind of offer structure is regarded as ideal service by the participants, hence on of our goals in the examination is the determination of the directions of the probable service developments and enlargements.

We will endeavor to analyze in detail the parting, the overlapping and the construction of the architectural processes and of the investment process by the investment program;

We would also aim to investigate the differences caused by age groups and cultural values in the reasons of the style selection of certain clients, as well as other reasons of the size of the investment expenditure.

Given by the qualitative character of the present research phase the greatest obstacle of our investigation (stemming from the methodology) is that our results cannot be extended to any basic multitude. We would therefore reduce and supplement this deficiency by the quantitative phase executed at a later stage. And

lastly, we would also seek to support the validity of the structure of our model with numerical data.

Projects may involve the involvement of professionals in both cost reduction and efficiency improvement. Different generations gave similar responses, so we need to look further at the relationship between increasing employment and examining the effectiveness of investments, but we have come closer to achieving the goal by identifying corporate branding and employee preferences.

Acknowledgement

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Complex performance matrix revisited

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Abstract: The aim of this study is to revisit the fundamentals and the practical usability of the Complex Performance Matrix (CPM). The CPM was established as a straightforward evaluation tool that offers comprehensive overview the financial and non-financial performance of organisations. Based on the literature review, the Author suggests that CPM should be a sound tool to measure complex corporate performance and could be an integrate part of the managerial dashboard.

Keywords: Corporate Social Responsibility, financial performance, non-financial performance

JEL: M14, M21

1 Introduction

With global problems (e.g. increasing social inequalities, migration, extreme weather conditions, etc.) becoming part of our everyday life, sustainability and responsibility for impacts of own activities are considered some of the most dominant topics nowadays. Although some authors claim that due to its too frequent use, the concept of sustainability is unsustainable itself [9], the climate responsible lifestyle and economy are important factors of social discussions.

Although some communities made significant progress to solve global problems including "global commons, nature, greenhouse gas emissions and climate change, and the deep global interconnection of economies and supply chains that mean anything less than global co-operation produces sub-optimal solutions" (Schanes et. al, 2018:7). The United Nations' Sustainable Development Summit in 25 September 2015 adopted the agenda entitled "Transforming our world: the 2030 Agenda for Sustainable Development" and the related Sustainable Development Goals (SDGs). These documents could serve as important instruments of global co-operation. Although deviation from the fulfilment of the SDGs cannot be

sanctioned, the monitoring process may contribute to the maintenance of social and political support. Compared with the former UN Agenda (Millennium Development Goals, MDGs), the SDGs have two significant novelties. First, whereas MDGs focused on the problems of the developing world (such as hunger, sanitation, basic infrastructures, etc.), the SDGs address global challenges faced by both developed and developing nations. Second, unlike the MDGs, the SDGs explicitly turn to all businesses to apply their creativity and innovation to respond to sustainable development challenges [22].

Theoretical frameworks were elaborated to understand better the non-financial performance of corporations. The most cited frameworks include Corporate Sustainability (CS), Corporate Social Responsibility (CSR), Corporate Social Performance (CSP), Triple Bottom-Line (TBL or 3P) and ESG criteria. There are many similarities in the abovementioned approaches. First, sustainability is built upon three pillars (environmental, societal, economical). Second, weak definition of sustainability is assumed, namely substitution between artificial and natural capital is expected [11]. Third, the calculation of complex performance (i.e. the sum of performance on the three pillars of sustainability) is problematic. The Complex Performance Matrix (CPM) can be a sound method concerning the last issue [21]. Although CPM provides only a comprehensive view of the complex performance, it can be used as a part of a management information system. The objective of this paper is twofold: (1) to answer the questions and issues emerged since the release of the former article; (2) to reassess and improve the theoretical foundations of CPM.

In the following section the relevant literature is overviewed. The subsequent section contains the methodology, and the next one results. The last section includes the conclusions.

2 Different approaches of corporate responsibility

The objective of this paper is to assess the theoretical fundaments of the CPM and answer the questions that have emerged since the publication of the method. Therefore, only the relevant literature is reviewed in this section.

The CPM is associated with the literature of corporate sustainability (CS) and corporate social responsibility (CSR). CS is a specific stream of literature that "deals directly with the role of business, i.e. economic value creation, when it comes to ecological and social concerns" (Vildåsen et. al, 2017:40). Corporate social responsibility can be defined as the complex of economic, legal, ethical and philanthropical responsibilities of a corporation [2]. Though Carroll [2] urges that legal responsibilities should be part of CSR, there is no consensus about it in the relevant literature. According to the definition of the European Commission (EC),

CSR is a "concept whereby companies integrate social and environmental concerns in their business operations and in their interaction with their stakeholders on a voluntary basis" [3]. The EC highlights that CSR "concerns actions by companies over and above their legal obligations towards society and the environment" [3].

Gering [5] identifies three turning-points in the CSR literature: (1) the so-called Friedman-doctrine according to which the one and only responsibility of the firm is to maximise shareholder's value; (2) the CSR pyramid approach of Archie B. Carroll according to which financial performance and CSR are complementary functions; (3) the approach of business with political responsibility.

There are no strict borders among the abovementioned approaches. Although Friedman [4] writes that the single responsibility of the business is to maximise profits (and thereby maximise shareholder's value) but he recognises as well that businesses must conform to the basic rules of society embodied in law and in ethical custom. That means that managers who work according to the Friedman-doctrine conform the economic, the legal and the ethical dimensions of the CSR pyramid, and reject only its philanthropical part. It is important to remark that businesses are reactive actors in both approaches, namely their responsibility is based on societal expectations. That reactive role is verified by the theory of explicit and implicit CSR [12]. The authors claim that based on the theory of varieties of capitalism (VoC) [7], the CSR practices of developed countries can be divided into two types: (1) since the role of the state is weak in liberal market economies (LMEs), the responsibility of businesses is based on societal expectations, therefore such a CSR is labelled explicit; (2) since the role of the state and other actors (such as industry chambers, trade unions, etc.) is more important in coordinated market economies (CMEs), many attributes of business life (e.g., environmental standards, industrial relations, wages, etc.) are codified, therefore CSR practices are rather implicit.

The approach of business with political responsibilities is relevant mainly for multinational companies (MNCs) and transnational companies (TNCs), because due to the size of these entities, few states or organisations can influence their activities and behaviour. At the same time through their operations (by the provision of goods and/or services, investments, workplaces, work relations etc.) the impact of these corporations on the life of the citizens is significant in many countries. Therefore, Scherer et. al [17] argue that MNCs and TNCs cannot behave in a reactive way anymore, but they should be proactive, and they should undertake societal activities based on their own values and norms.

There are many tools available to help to report on sustainability related activities of organisations (such as companies). These so-called sustainable reporting tools (SRTs) can be divided into three groups [18]: (1) reporting frameworks (e.g., GRI, UN Global Compact etc.); (2) sustainability related standards (e.g., ISO 14001, ISO 26001, EMAS, OHSAS 18001, etc.); (3) third party ratings and indices (e.g.,

Dow Jones Sustainability, FTSE4Good etc.). Harangozo [8] amends this with a fourth element, the strategy that comprises tools such as the Sustainability Balanced Scorecard (SBSC) or the ecoefficiency approach of WBCSD. The CPM measures the dynamics and the relative performance of business compared to its competitors, thus it is part of the strategic tools. Nevertheless, data can be collected from different reporting frameworks.

The Global Reporting Initiative (GRI) is the global standard among sustainability reporting frameworks [13]. This fact is based on the survey of KPMG [10] stating that 82 percent of sustainability reports of the 250 largest companies mention GRI. The main advantages of this framework include its well-elaborated reporting principles and the ready-to-use indicator set provides assistance in the reporting process. Furthermore, it helps to compare the performance of different entities due to its standardised approach. The indicator set of GRI is grouped into three categories, from which three (economic, environmental, societal) are identical to the triple bottom-line approach of John Elkington, whereas the fourth group comprises comprehensive indicators that concern information such as size of the entity, the number of employees etc.

Nevertheless, we highlight two GRI-related problems: (1) reporting according to the GRI is voluntary, hereby organisations have the opportunity to pick out only indicators that are favourable for them, thus concerns related to the holistic approach of sustainability emerge [15]. It is also remarkable that this cherry picking behaviour may contribute to the increasing popularity of sustainability reporting as well [15]; (2) regarding non-customised (i.e. ready-to-use) indicator sets, there is a risk that matching happens "without verifying, or even considering, the indicator-indicated fact relation"[6].

3 Methodology

We assess the practical usability of the method in this paper. Since it has not been applied in the practice yet, the methodology of this paper is mainly theoretical, based principally on the available literature.

Our results are associated with the main attributes of the method. These questions are as following: (1) the objective of the analysis – in what cases and for what is the method useful; (2) the analysed firms – what kind of companies can be assessed; (3) the indicators – which indicators can be applied in the analysis? (4) the way of comparison – how to compare the companies; (5) the results and conclusions – what types of results are expected from the method?

4 The structure of the CPM

The structure of the CPM is quite simple: the method uses a coordinate system where at least three but maximum four indicators are presented simultaneously. That solution contributes to performance measurement for the following reasons: (1) since at least three indicators are shown simultaneously, the CPM is suitable to compare a financial indicator (e.g., the profit rate) and a non-financial indicator (e. g., greenhouse gas emission per product) with a third, independent indicator (e.g., firm size or turnover); (2) the method is suitable to show the relative performance because the scale of the indicators is identical, where the extreme values are identical with the worst and best performer businesses; (3) for dynamic analysis, indicators are proposed to be used for more periods.
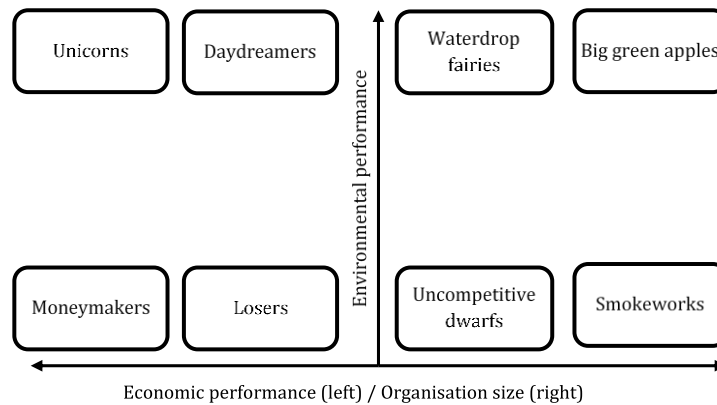

Figure 1 The structure of the CPM (Szennay, 2016)

The practical usability of the CPM is discussed in the following subsections according to the questions asked in the methodology section.

4.1   The objective of the analysis

The objective of the CPM is to assess the market position of a firm based on its financial and non-financial performance. The method lays emphasis on market trends rather than the volume of data; therefore, it can be a sound part of the management information system. The analysis can be conducted in two ways [21]: (1) as a market analysis method; (2) as a portfolio analysis method.

In the case of market analysis, the present and former performance of the analysed corporation and its competitors is compared according to selected indicators. The analysis can reveal trends on the relative performance in the reference period. The main benefits of the CPM are the following: (1) the performance of the company can be compared to its own former performance, and thus, positive or negative

trends can be revealed; (2) the performance of the firm is compared to that of its competitors and this makes the evaluation of relative market position possible. Furthermore, it filters out distortions caused by other industries. The objective results of the analysis may be threatened by the inadequately selected reference period and/or competitors.

Regarding companies with more divisions and/or subsidiaries, the CPM can be used as a portfolio analysis tool as well. The objective of this analysis is to assess and compare the performance of divisions and/or subsidiaries. The benefits of the CPM are in this case the following: (1) a comparison of the performance of different divisions and/or subsidiaries as well as their contribution to the performance of the firm as a whole is possible; (2) the change of the performance of divisions and/or subsidiaries can be stated, and thus the best and worst performer part of the firm can be identified as well; (3) the performance of divisions and/or subsidiaries can be compared with that of competitors. It is important that the results and conclusions of the portfolio analysis may be threatened by intrafirm transactions such as transfer prices, inadequate indicator calculations, etc.

4.2   The analysed firms

When the CPM is used as a market analysis tools, adequate selection of competitors may influence the conclusions significantly. As Szennay (2009) highlights, the headquarter country of corporations may be relevant due to the different societal expectations of the countries. That implies that sustainability-related decisions are influenced by societal expectations, that is to say, the author suggests implicitly the use of the CSR pyramid approach and company without political responsibilities. Since shareholders and other stakeholders (such as employees, local communities, vendors, etc.) are interested in the results of the activities (e.g., the rate of return, work relations, price and quality of product/services etc.), it is inadequate to make such limitations.

Nevertheless, the external operational environment may influence the operations of companies. As Matten and Moon [12] claim, corporations of liberal market economies engage sustainability related actions on a voluntary basis, whereas such actions in coordinated market economies are forced mainly by laws, regulations, standards and norms, therefore voluntary activities are rather rare. This finding is consistent with the results of Prakash and Potoski [1], that is to say the greenhouse gas (GHG) emission of corporations with ISO 14001 is significantly lower than the emission of companies without such standard in case of countries with loose environmental regulations There is no substantial difference in countries with strict environmental regulations.

4.3 Indicators

Because of the specific feature of the coordinate system, at least three but maximum four indicator can be used simultaneously. With such an aggregation of data, the CPM can only satisfy managerial needs, therefore it may be used as (an element of) a dashboard, where indicators included in the quartiles are modifiable.

The indicators used in the analysis must fulfil the following minimum criteria: (1) the methodology and the indicated facts should be identical for each analysed firm and period; (2) the indicators should be conforming with SMART criteria, i.e. specific, measurable, achievable, real and time-bound [6]; (3) the indicators should be relevant, in other words, they should be set according to the indicated fact [6]; (4) in order to measure complex performance, indicators of financial and non-financial performance should be used simultaneously.

For better understanding we suggest the use of a financial and a non-financial indicator on the horizontal axis and one or two comprehensive indicators (e.g., the number of employees, total assets, market capitalisation, etc.) on the vertical axis. Though Szennay [21] argues that societal indicators should be excluded from the analysis, because they exert insignificant influence on non-financial performance [14], that standpoint is inadequate for two reasons: (1) one of the most quoted criticism of TBL is that the performance of each dimension is measured on different scales [19], therefore they can be summed only with limitations [20], furthermore the frameworks provides a chance to compensate the bad performance of a dimension with an another; (2) in case of GRI, the ratio of societal indicators is too high [13]. Accordingly, the use of indicators from each dimension is suggested.

4.4 The way of comparison

The CPM uses indicators not in natural units (such as dollars, metric tons, etc.) but in a common scale. Its importance is twofold. On the one hand, in case of a common scale the result can be assessed visually. On the other hand, in this case the difference of the units does not matter. Though in the example of Szennay (2016) scale of 0 to 1 is used, that scale can be 0 to 100 or another scale as well.

4.5 Results and conclusions

Many conclusions can be drowned on the basis of the CPM. Making conclusions is the task of the analyst. However, we highlight the most important opportunities.

As Szennay [21] claims that "the conclusion is fairly clear only if there is/are company(ies) in corners". Companies in corners can be illustrated with names as well. Under normal market conditions, however, companies are expected to be

outside these fields. Therefore, it is attractive to make a dynamic analysis, because it allows to analyse performance changes over time, even the absence of changes can provide information on performance. We suggest the use of conclusions according to its wider context and the objectives of the company.

It is remarkable that economic performance can be maximised in most cases according to the economies of scales, while there is no evidence from such determinations in case of non-financial performance. Therefore, it is suggested analysing relationship between growing size and change of non-financial performance.

Conclusions

The objective of this paper is to revisit the usability of the CPM and to answer questions having emerged since the publication of original report (see Szennay, 2016). Since the CPM has not been used in practice yet, it was a legitim claim that the method may have problems or shortcomings that hinder its application. We assessed the method on the basis of domestic and international literature accordingly in order to determine whether the CPM is applicable in practice and if the answer is yes, under what conditions.

The CPM belongs to sustainability reporting tools and it can be applied in strategy making and as a part of management information systems. According to our analyses, there are no conditions that can hinder the practical use of the method. It can be used even in more cases and with a greater determination power than we expected in the original paper in 2016. Our main conclusions are as follows: (1) the population of analysable companies is influenced by societal expectation factors less than expected. We assume that companies of developed countries and companies operating in the markets of developed countries can be assessed by the method without significant limitations; (2) there is no well-founded reason for rejecting societal indicators. Furthermore, we suggest the creation of a managerial dashboard, where indicators of each quartile can be modified dynamically. That suggestion can contribute to the strengthening of the holistic approach; (3) we argue that the use of a common scale in the analysis is necessary, because without that conclusions can be significantly distorted.

The main limiting factor of our results is the absence of practical use. Though the CPM is fairly sound according to its theoretical fundaments and demonstrative applications, the method has not been applied in real market conditions.

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The analysis of the health care market development in Poland – its directions and threats

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Abstract: The health care system is an important part of the economy of each country. The limited availability of resources (including financial) and unlimited health needs result in a permanent conflict. The aim of the paper is to present and interpret selected issues about the health care market development in Poland – its directions, risks, barriers and incentives of further expansion. The analysis will be based on selected statistical indicators, as well as regulations for the organization and financing of the health care market in Poland.

Keywords: health care, Poland, finance, development

1 Introduction

Health care has a significant impact on the development of society, the national economy and the entire country. As part of health care, actions are taken to maintain, improve or restore the health of the population, as well as medical activities aimed at protecting and maintaining life. This vital role of health care causes that its basic product-health care service, is in many countries a social (public) good. It is a good which, due to its physical features, can be financed from private funds, but due to high costs limiting its accessibility and implemented state policy is financed or co-financed (socio-private good) from public funds [16, pp. 26- 28].

Health care is implemented in a large part in quasi-market conditions. Health services providers are facing competition among themselves which creates the need to apply for public funds and meet certain standards, including quality ones. On the other hand, on the market, among the insurers, there is a tendency for

negative selection, as well as many other phenomena that distinguish this market from the classic and full free market economy.

Arrow's thesis advanced in 1963 [1] that this market, due to its special attributes (irregular, unpredictable demand; expected behavior of the physician; product uncertainty, agency relationship; supply conditions and licensing of profession; pricing practices, negative selection), is not able to shape itself, which results in the necessity of state interference in its organization and functioning, seems to be still actual. This remains a current issue even despite organizational changes, conditions and the scope of services provided, a much higher level of expenditure, which is also confirmed by the fact that there is still no country that would be fully satisfied with its health care system [24].

As a result, it is generally acceptable to partially regulate this market, as well as the presence of public and non-public organizations dealing with the distribution of financial resources and health care services. The relationships and position of these two groups as well as the structure of financial flows in the health care system are shaped differently, depending on the historical, cultural and political conditions, and also the wealth of the society.

2 History of health care market in Poland

The health care system in Poland has undergone transformations in the last 20 years, from the supply model towards the insurance model. Reforms in this area were a natural consequence of the change in the economic system. From a historical perspective, it is also important to emphasize that health care in Poland had been subject to many reforms before. After the end of World War I and the regaining of independence by the Polish State, the first attempts at a comprehensive design of this system began. In 1918, the Ministry of Public Health was created, as well as the sickness funds. Financing health care, which was initially not common, was implemented both from public and private sources [9]. These actions were, however, interrupted by another war, after which the health care system was shaped along the lines of the socialist model. Centralization and nationalization of finances followed, and gradually exclusion the market of private health care entities. Inpatient and specialist outpatient health services were carried out as part of the three main levels (local, regional and national), and at the lowest level supported additionally by outpatient primary care (Figure 1).
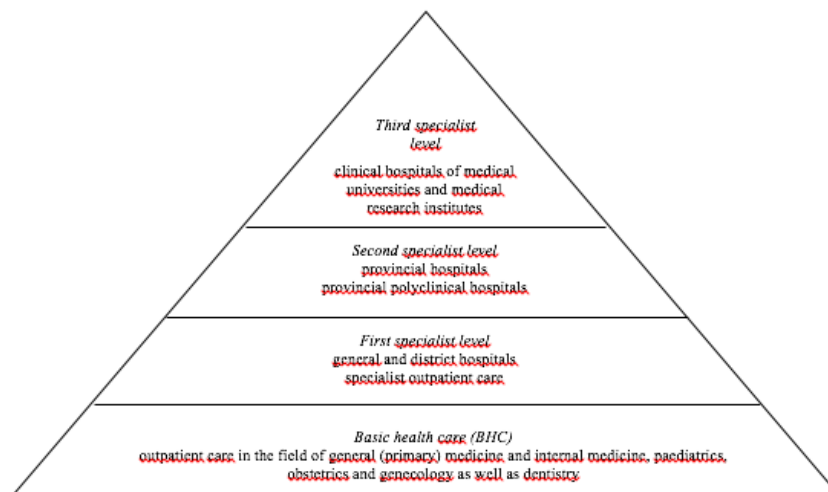
Figure 1. The structure of Polish health care services provided before the reorganization in 1999
Source: based on [25, pp. 55-59].

This structure, in a slightly changed form, also applies today.

In the contemporary history of the health care market in Poland, the year 1999 is important as from this point the centralized, budgetary system of financing health care was replaced with the insurance system. On January 1, 1999, the Act on universal public health insurance [28] also became applicable, subsequently subjected to modifications and amendments (replaced by subsequent acts). Though, these changes concerned modifications within the system, not turning it completely to another.

There were introduced health maintenance organizations (public), which in regions (16 + 1) distributed public funds between entities. In order to obtain funding, health care establishments had to join offer competitions and meet certain requirements. Instead of budget-based financing payment for the service has been introduced (with some exceptions). The previous system was characterized by the transfer of funds based on the number of beds, full-time jobs and amounts from previous years, for a specific entity, omitting analyzes of costs, type and quantity of services provided. The new system – objective one, introduced the principle of money following the patient in the system and the service provided.

At the same time, the possibility of establishing private health entities was freed up, as well as the need of public entities to become independent. This independence lies in the fact that these entities manage their property independently, and cover the costs from the revenues. They also administrate their own financial result (periodically, the founding body of public entities covers their negative financial results, while it cannot take over the positive ones).

In the subsequent years, the insurance system of health care in Poland has been subjected to further modifications resulting from revealed imperfections, volatility of characteristics and requirements of the environment, as well as social expectations and political decisions.

In response to the criticism of the independence of the operation of the health maintenance organizations, there was introduced a centralized National Health Care, with branches (16). Regulation of the prices of medicines available in the general circulation has begun, and recently the financing of inpatient care has been modified significantly.

Health care in Poland has been financed for the most part from public sources (Figure 2), among which the most important is the social insurance contribution paid by the insured either directly or indirectly (through an employer or other substitute payer) to the Polish Social Insurance Institution (ZUS) and to The Agricultural Social Insurance Fund (KRUS).
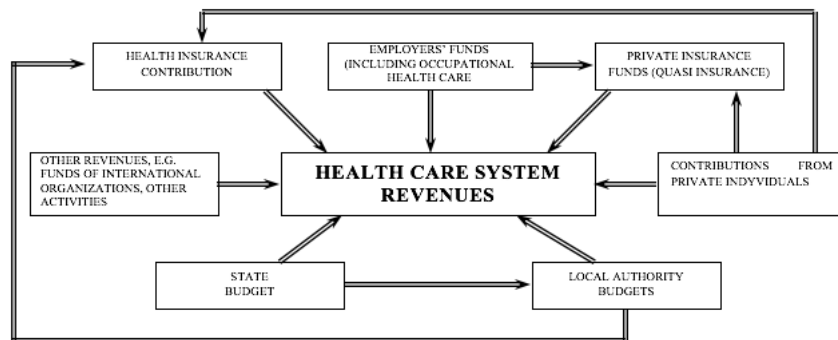

Figure 2. Health care system revenues
Source: own elaboration.

The revenues collected in the public sector for the most part then form a financial plan for the implementation of National Health Fund expenditure (Table 1).

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Table 1. National Health Fund's financial plans for years: 2011, 2014, 2018, 2019

	2011	2014	2018	Dynamics 2018/2011	Plan for the year 2019
Revenues from health contribution (ZUS, KRUS) in thousands PLN	58,001,348	64,402,927	79,802,788	138%	84,370,511
Total net revenues	60,084,386	66,909,138	83,895,654	140%	88,665,706
Total costs of medical services, incl:	56,663,995	64,517,195	81,359,868	144%	83,657,338
primary health care	7,347,291	7,727,318	10,665,140	145%	11,114,070
outpatient (specialized) health care	4,175,970	5,540,596	5,022,839	120%	4,658,233
hospital care	24,144,121	31,101,102	42,110,915	174%	38,814,383
medicines (except hospitalization)	8,551,097	7,938,896	8,408,541	98%	8,204,435
other	12,445,516	12,209,283	15,152,433	122%	20,866,217
Other costs of tasks[11]	2,310,513	2,474,752	2,655,601	116%	3,682,787

Source: own study based on [32], NHF financial plans for the years 2011, 2014, 2018 and 2019 (22.11.2019).

In the subsequent years, the value of the public payer's financial plan increases regularly. In 2018, the public payer's financial plan was increased by about 15% (PLN 4 billion) compared to the previous year (2017, not shown in the table), and the increase in funds was recorded in primary care, long-term care and rehabilitation. Although there has been a decline in the area of specialist outpatient care, it is only a way of presenting the data in the plan and new financing rules, which cause that in a large part this care was included in the hospital lump-sum (global budget). The largest proportion in public payer's expenditure is

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[11] Obligatory deduction for the general reserve, commissioned health policy programs, emergency medical teams and others.

represented by inpatient care, in which the level of financing is constantly increasing. As mentioned above, the full comparability of the data is not possible because the principles and ranges of financing health services are constantly being changed, of which the most important changes took place in 2017.

In 2017, a significant modification of spending public funds for inpatient and outpatient treatment was introduced in Poland. There was also brought in the so-called a network of hospitals [22, 29], within which six levels of provision of inpatient services were identified:

- 3 basic levels of health care provision, including hospitals I (the lowest level), II and III level

- specialized levels of health care provision, including oncology, pulmonology and nationwide hospitals (clinical hospitals, institutes).

The qualification for particular groups took place automatically in most cases, by fulfilling appropriate criteria required at a given level by the analyzed entity. Unfortunately, the indicated criteria have greatly limited the possibility of joining the network by private hospitals.

Hospitals covered by the indicated network receive a significant part of the financial resources in a lump-sum form, i.e. the global budget [21]. The amount of the lump sum depends on the number and structure of medical services provided in previous periods. In addition, the requirements of the hospital network have resulted in some outpatient services being part of this lump sum, which is a manifestation of the implementation of the coordinated health care system. The lump sum payments exclude those medical services which, due to the necessity of adequate access to them, are subject to financing on the terms previously applied, i.e. contractual agreements concluded in a competition mode [23].

Considering the subjective criterion, which distinguishes sources of financing for health care entities (micro scale), there are revenues obtained from:

- contracts concluded (contracts, budgets) with the National Health Fund (NFZ) and private fees (natural persons, employers),
- contracts concluded with other medical facilities – subcontracting,
- subsidies for a public entity from the founding body, the Ministry of Health and other state institutions,
- funds provided by the Ministry of Health, National Health Fund for programs in the field of public health protection,[12]
- other.

The structure of proportional individual sources of financing varies, and depends on the legal form of the conducted activity, the scope of services provided, the referral level of the institution.

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[12] There is a trend to limit state direct expenditure on health care.

3 Materials and methods

The overall goal of the research is to present and interpret selected issues about the health care market development in Poland – its directions, risks, barriers and incentives of further expansion. The specific objective is to identify areas of development potential and highlight the aspects that are particularly important in the implementation of the state's health care policy.

The conducted research is based on a meta-analysis of the literature, analysis of reports of organizations dealing with the subject of health care, as well as statistical data collected in the system of national official statistics (GUS) and international statistics (OECD). Conducted considerations and final conclusions were developed using the descriptive method, inductive reasoning.

The limitation for the results of the conducted research is the multiplicity of sources of statistical data and discrepancies in the presented data concerning the same subject scope and the same period. The limitation is also incomplete delivery of data by the statistics system, which results from the adopted assumptions as well as organizational and formal constraints.

Moreover, in the detailed scope of the considerations, especially in the area of attributes, challenges and threats to the development of the health care market in Poland, it is undoubtedly possible to identify additional factors that shape them. Due to the limited frame, only some of them were selected and discussed.

4 Results

The basic contribution to the state and development potential of every health care system is the appropriate level of its financing. There is a permanent increase in the health care spending in Poland, as well as the share of public expenditure is much more higher than the share of private expenditure. It is typical for an insurance model of health care system with mandatory health insurance (Table 2).

Table 2. Health care expenditures and other financial indicators

	Poland (in million PLN)		
	2004	2013	2015
Current health care expenditures (SHA2011-since 2013)	54,756	105,849	114,142
- incl. public expenditure:	37,093 (68%)	74,878 (71%)	79,886 (70%)
- incl. private expenditure	17.663 (32%)	30,971 (29%)	34,256 (30%)
Current expenditure in % GDP (average for OECD in 2015 9%)	5.93%	6.38%	6.34%
- incl. public expenditure	4.02%	4.51%	4.44%
- incl. private expenditure	1.91%	1.86%	1.9%
Per capita health spending (total) in USD (OECD average in 2015 – 4,004; in 2005 – 2,759)	867 (2005 y)	1,530	1,798 (2016 y)

Source: based on [2], [5], [6], [8], [13].

• The expenditure on health care in Poland is still much lower than the average level in other countries, which for OECD countries amounted to 4.004 USD (in Hungary in 2015, USD 2.101 per capita). Poland ranks 4th from the end, overtaking only Turkey, Mexico and Lithuania. The government recently adopted a plan for the gradual increase, so that in 2025 the level of public spending on health care would reach 6.0% of GDP. However, it should be emphasized that it is important not only to increase public spending on health care, but also to increase the efficiency of resource management in this sector. A positive step in this direction was certainly the launching of the process of pricing (valuation) of health care services in Poland, carried out by the Agency for Health Technology Assessment and Tariff System (AOTMiT). This process was started in 2015. From that date, the agency received tasks related to the tariff plan for health care services, such as [26]:

- determining the tariff system,
- the development, verification, collection, sharing and dissemination of information on the methodology for the assessment of medical technology, medical technology developed in the country and abroad, the principles of determining the tariff system,
- developing proposals for recommendations on standard costing,
- conducting training.

• As a result of the work carried out, an appropriate, reasonable in relation to costs, allocation of funds for health care was sought.

This trend is also characteristic for other countries of Central and Eastern Europe, in which the processes related to getting to know the real costs of medical procedures and allocating the appropriate margin included in their valuation are visible [18]. Meanwhile, a universal financing of hospital services in the form of a lump sum was introduced in Poland from 1 October 2017, using, in part, information on unit costs of services, but not including the price-cost relationship of the health care service. Such a solution may undoubtedly contribute to the deterioration of the rationality of spending public funds from a cost perspective. The introduction of a lump sum for services provided is in part related to the return to retrospective financing of medical care, based on a historical budget, derived from the previous period data. This budget is subject to periodic correction of the value of inpatient care and other services (e.g. re-treatment rate, indicator of specialist outpatient and other outpatient services). It can therefore be concluded that the method of financing which was applied in Poland before 1994 was partially restored.

A positive effect resulting from economic growth, increase in welfare and maturity of societies, as well as growing health awareness is the increase in life expectancy. The level of financing health care also has an impact on this area.

This trend is also visible in Poland, where in 2005-2015 the life expectancy increased by over 2 years among women, while among men by 1.7. Unfortunately, in this second group, this indicator is much below the average for OECD countries, which is 77.9. Therefore, the difference is over 4 years, and Poland ranks 6th from the end (Table 3).

Table 3. Life expectancy at birth

	Poland	
	2005	**2015**
Total population	38,173,835	38,437,000
Life expectancy at birth by sex (f-women; m- men)	79.4 (f)	81.6 (f)
OECD average in 2015: 83,1(f), 77,9 (m)	70.8 (m)	73.5 (m)
Life expectancy at age 65 (total)	n.a.	17.9
OECD average in 2015: 19.5		
Share of the population aged 65 and over (OECD average 2015 approx. – 17%)	13,2	Approx. 15%

Source: [3], [7], [10].

The life expectancy at birth by sex indicator for the Hungarian population is even worse than in Poland. In the group of women, it amounted to 79.0 in 2015 and 72.3 in the group of men. A similar situation applies to Life expectancy at age 65 (total), which in 2015 in Hungary was 16.4 and was the lowest among all OECD countries.

Looking for the reasons for the constantly lower life expectancy, the insufficient level of financing for health care is undoubtedly the first place to point to, as presented above. However, life expectancy is also affected by other worrying health-related phenomena, such as obesity, smoking, alcohol consumption and the state of the natural environment.

Similarly, the indicators showed negative development in the area of cigarette smoking, almost 23% of Poles' population smokes every day, while the average for OECD countries is 18.4% (in Hungary, this indicator was 25.8% in 2015).

Liters of alcohol consumed per capita in a year on average among OECD countries amounted to 9.0 in 2015, 10.5 in Poland, and, for example, in Hungary, 10.9. Although this indicator is not high in Poland, it is stressed that Poland is one of the OECD countries with the highest growth rate in recent years of alcohol consumption, alongside countries such as Latvia, Belgium and Iceland.

The problem of obesity can be expressed as a percentage of population with BMI higher than 30. The average for OECD countries amounted to 19.4 in 2015, in Poland 16.7 and in Hungary as much as 30%. It should be added that for Hungarians it is the 4th position from the top. The first place is occupied by Americans with the 38.2% of population, then Mexicans 33.3, and New Zealanders 31.6.

While the current obesity index is not negative for Poland, we can observe phenomena that will have negative impact on it in the near future. For example, the daily vegetable eating indicator expressed as % population aged 15 years and over among adults is below the average for OECD countries in Poland (55.7 versus 59.8). A positive phenomenon is that the adequate index for fruit is slightly above average. However, in the group of children up to the age of 15, both indicators are well below the average for OECD countries. Self-reported overweight in 15-year-olds has increased in most OECD countries in the past decade (average 15.3% in 2013-14), but the biggest increases occurred, inter alia in Poland, where overweight rose by more than 50%.

An important factor that negatively affects the health condition of society in Poland is air pollution.

This results in increased morbidity and mortality on lung cancer, respiratory and cardiovascular disease and low birth weight. What is more, it should be noted that air pollution also reduces the quality of life, affects the decrease in physical activity.

The air pollution index expressed as the mean annual exposure to PM2.5, mg/m3 was 15.1 on average in the OECD group, while in Poland 24.3 and Hungary 23.1, which places these countries among the four most vulnerable ones, just after Turkey (36.4) and Korea (28.7). It is also worth adding that according to the WHO report [11], among the 50 most polluted cities in Europe, 36 are in Poland (among the first 10 cities 7 come from Poland, 3 from Bulgaria). Among these 50 cities

there is none from Hungary, while 7 are in Bulgaria, 2 in the Czech Republic and 5 in Italy). The cities of India, China and Saudi Arabia dominate among the most polluted cities in the world.

In Poland, the index of main causes of mortality induced by circulatory system diseases and cancer is much higher than the average in OECD countries.

The level of access to health care is also in Poland, as in United States and Greece, one of the lowest among OECD countries. Waiting times for elective surgery are long in a number of countries, particularly Estonia, Poland and Chile.

In Poland, an example of the particularly long waiting time for health services is cataract surgery (number of days from referral to procedure is 464), which places our country at the forefront. However, since 2017, a public payer has been providing significant funds for this type of surgical procedures (as well as several others showing similar characteristics), so undoubtedly this index will certainly be lowered in the next OECD ranking.

The reason for the limited access to health care services is certainly the low level of funding, but also the availability of other resources, including in particular hospital beds and qualified medical personnel.

According to statistical data, the number of hospitals has been growing in Poland in recent years, although the number of hospital beds is decreasing (Table 4), which is related to the specialization and periodic establishment of the private market that develops mostly in a small, specialized scope in inpatient care.

Table 4. Number of general hospitals and their beds

Specification	2000	2005	2016
General hospitals:	716	781	956
Beds in facilities	190,952	190,387	186,607
Beds for 10 thous. population	49.4	49.1	48.6
In-patient in thous.	6,007	6,739	7,829
In-patient per 10 thous. population	1,554	1,765	2,037
Average length of stay in days	8.9	6.7	5.3
Number of stays per bed	31.5	37.5	44.3
Average use of bed in days	298	252	234

Source: based on [17], [19], [20].

In the years 2000 - 2016 there was a decrease in the number of beds in general hospitals, from 190,952 in 2000 (and in the previous 20 years, this drop also occurred in a much higher proportion) to 186,607 in 2016, i.e. by 2.2%. Along with the decrease in the number of hospital beds, the number of people treated rose from 6.007 thous. in 2000 to 7.829 thous. in 2016. The increase in the number of people treated in this time interval amounted to 30%, so there is a clear upward trend in the number of people treated. Such a situation is caused, among others, by an increase in the number of elderly people as well as an increase in the health awareness of the society, which does not improve the functioning of the entire system, because it significantly increases the cost of medical services and should be replaced by a much cheaper outpatient treatment.

However, despite the decreasing number of beds and the increasing number of inpatient care, in connection with the decrease in the average period of hospital stay (from 8.9 day in 2000 to 5.3 in 2016), it certainly indicates the improved efficiency of management. On the other hand, it seems, taking into account the average use of bed in days, that there is still an excess of hospital beds compared to the needs. Analyzes in this area are extremely difficult due to the need to maintain the so-called readiness to provide services, as well as meeting certain standards of the level of resources required by the payer. Still, this is confirmed by the data presented by OECD for 2015, where the average of beds per 1000 inhabitants was 4.7, while in Poland – 6.6).

An important issue is also the availability of medical staff. The average for OECD countries in the scope of availability of medical practitioners amounted to 3.4 per 1000 inhabitants in 2015, while in Poland – 2.3, and, for example, in Hungary – 3.1. A worse level of availability than in Poland is only in Korea, Turkey and Chile. The index in terms of availability of nurses is also dramatically changing (in Poland 5.2, OECD average 9.0).

An important threat and a challenge for health care in Poland is the aging of the society. There is an improvement in the populations' health all around the world. The results are also visible in the growing proportion of the population aged 65 and over (see Table 3). It is estimated that in the next twenty years, the number of people 65+ will increase in Poland by about 3 million to the level of 8.5 million. It is also estimated that this trend will be higher in Poland than in other countries (about + 6% per annum) [18]. Meanwhile, in 2019, NHF expenditure in terms of care and assistance services as part of long-term care is, according to the plan, higher than in the plan for 2018 only by approx. 2.2%, while in palliative and hospice care the increase was only 0.3% (see Table 1, though, these items are aggregated in the 'other' group).

Ageing of the population will imply the necessity to development of geriatric specializations. Such need has started to occur for last few years. Meanwhile in

Poland was in about 170 doctors specializing in geriatrics, while only 120 of them were active, but only 70 worked in their original specialization. Moreover, the average age of geriatrics doctors is the highest among all doctors specialization, as well as geriatrics is not a mandatory subject in higher education [15].

Strictly connected with aging population is accessibility to long-term care. One can observe that In 2005 in Poland were 21 long-term beds in institutions and hospitals per 1000 population aged 65 and more, while the average in OECD countries was 41. During the last few years, not only did Poland not improve in this respect, but quite the opposite – there were 18 long-term beds per mentioned population (an average for OECD countries increased to 49.7).

Conclusion

In Poland, the health care market functions in a similar way to comparable European countries. Poland has to face problems that are rather typical for many European countries [27]. However, the scope and level of these problems are much more severe than in other countries [25].

Although the market is based on a universal and compulsory health insurance contribution, concentrated in the hands of a single payer controlled by the state, it shows some negative features as well as some indications of adverse phenomena which may occur in the future.

The main problem is accessibility to health care, particularly among older people and some of the arising civilization phenomena. At the top of the problems' pyramids are: air pollution and lack of resources devoted to solve health problems of aging population (e.g. nurses, medical doctors, specialized inpatient care). Particularly dangerous is the problem of obesity. It is true that the current obesity indicator for the Polish population is at a more favorable level than the average of OECD countries, however, phenomena associated with the consumption of vegetables and fruit allow to conclude that the obesity problem will escalate in the group of young people in the near future.

The number of hospital beds is the area where there is potential for managing the resources. Their adaptation to the location and specialties, also in the field of senile diseases, is the expression of the potential to increase economic efficiency

The new financing system introduced in the last year, which covers a large part of an inpatient care from the budget, presents a high risk. The effect may be restriction on expensive medical services as well as mismanagement in the allocation of resources and the use of financial resources.

Although the relative low value of resources (including human resources) on the Polish market constitutes a significant competitive advantage in relation to many other countries, the level of financing health care is still insufficient [12]. It is necessary not only to increase expenditures further, but also their reallocation towards the area of health care, health education and healthy food. This problem

occurs also in some other European countries, f.e. Hungary, where prevention and health promotion are underfunded [4] The state's health care policy should be provided on the bases of detailed statistical analyzes of databases collected f.e. by the public payer or other data sources so that the available resources are best located [14, 30].

Moreover, telemedicine services are an indication of development, which in the group of older people requires a gradual introduction of promotional and implementation activities. In this case, the passage of time is a positive supportive feature, as the share of older people with the awareness of the usefulness of computer systems and similar solutions is growing.

Last but not least, when comparing the current underfunding of health care with the premises for new problems, it is possible to predict that in the next 10-15 years Poland's position in the health care surveys of OECD countries will not be improved significantly.

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Apple crisis versus Karinthy' six steps

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Abstract: For many years it has been a problem for apple farmers in Szabolcs to sell their fruits at a reasonable market price. Will the Hungarian apple disappear from the market or is there a way back? The question may arise: how does Karinthy relate to the current apple crisis in Szabolcs? The answer could be found in the development of networks. Hungarian small and medium-sized agricultural entrepreneurs are in a vulnerable position due to their size. The size of the plots or farms isn't economical. This means that alone – without social support or network organization – they are not able to compete with larger agricultural firms [28]. The Hungarian people's mentality is unlike any other. While there are positive examples in the surrounding European countries, experts have met challenges to find a model that can work in the Hungarian environment. Social media is overwhelmed with voice of the outraged urban residents who blame the farmers for the situation that has arisen, and with the farmers' opinion, which are furious about the incompetent comments. The purpose of this dissertation is to find the path towards the solution: to present the characteristics of agriculture, the development of network sciences and to find the mistakes of the current situation.

Keywords: agriculture, apple crisis in Szabolcs, network, bio-farming, organic farming, competitive agriculture, technology development

1 Market environment

The European Union has grown over 12 million tons of apples in recent years, which is 1.5 to 2 million tons higher than in the period before 2010, and which the EU market can absorb. Growth was predominantly attributable to the strong development of Poland, which increased its previous 2 to 2.5 million tons production to 4-4.5 million tons, which has now become market and price-fixing in Europe [25]. Year after year, the quality decays and quantity of apple is

decreasing in Hungary as well. One consequence of this is that almost two-thirds of Hungarian apple production is industrial apple, and less fruit going to the fresh market. Plantation modernization would significantly promote the Hungarian apple market [3]. The social institutions of horizontal integration (co-operatives, sales co-operatives (TESZ), producer groups) play an outstanding role in the EU agricultural economy. Using collaborative models, the agrarian farmers build common capacities to counterbalance disadvantages and market positions in their co-operation, jointly managing inputs, capacity utilization and sales channels. [27][7][20][31][32].

2 The Hungarian Truth

Domestic agriculture, thanks to the country's favourable geographic characteristics, is a very long-lasting sector. The main agricultural products of the country - mainly cattle, wheat and wine - sold in significant quantities in the Central and Western European markets from the medieval [30]. Despite the fact that the importance of horticultural industries is not as great as the grain production with long historical past, it means the livelihood for many farmers, so we cannot ignore it. While cereal products and oil seeds are almost directly available for sale and their storage is simpler, only a limited number of vegetable and fruit products can be marketed directly, their storage duration is limited due to their perishability.

Following the survey in 2001, in 2007, 2012 and 2017, in accordance with the EU Directive, KSH (Figure 4. and Figure 5.) implemented four plant species (apple, pear, peach and apricot). During the change of regime, a large part of the fruit trees were aging and their replanting did not take place. Following the launch of EU accession, however, the number of orchards dramatically increased due to the appearance of new resistant varieties and support [30].
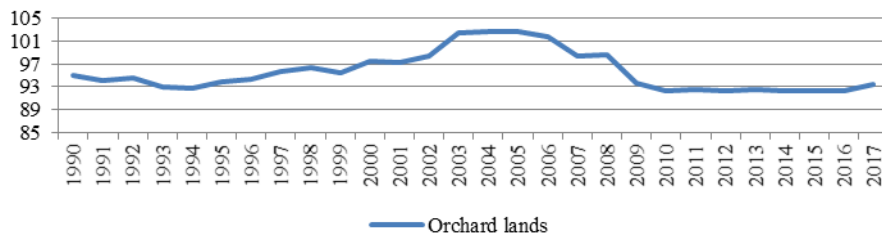
Figure 4.: Attendance orchard land 1990-2017

Source: KSH data, compiled by the author

Thanks to the EU directives, we now have adequate statistical data on how the number of orchards is distributed within the country (Figure 5). More than 75 percent of the orchards are in the Northern and Southern Plains regions, which due to the geographical circumstances can be granted [30)].
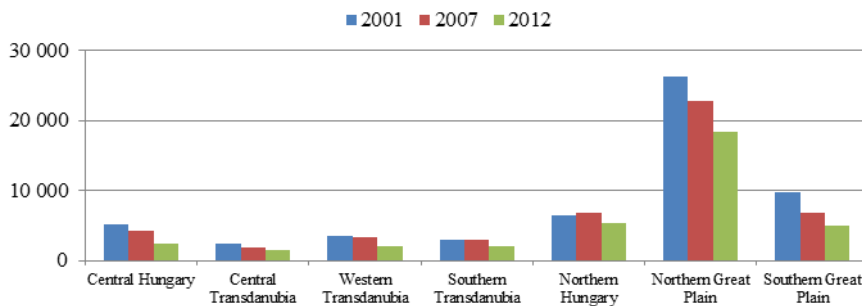
Figure 5.: Number and area fruit tree plantations by region

Source: KSH data, compiled by the author

The census of 2017 is based on many aspects of the orchards, such as organic farming, planting time, irrigation of farms, storage or refrigeration facilities, etc. Based on the database made in its compilation, it is proved by the fact that a negligible proportion of Hungarian farms chose the path of organic farming. The statistical data, on the other hand, confirm that a large number of farms are classified, which is a source of confidence. Organic farming also aggregated data from fruit species, from which data on apple plantations had been extracted (Figure 6). Classified apple plantations and organic farming show only around 10% of all farms.

The proportion of organic farming areas

Figure 6.: The proportion of organic farming areas
Source: KSH

The development of irrigation management can be a breakthrough for farmers. Hungary's standpoint is that the spread of water-efficient and efficient technologies in Europe can ensure that sustainable development goals are met. The representatives of our country are also urging for the development of drought monitoring and drought warning systems to increase the safety of agricultural production [1].
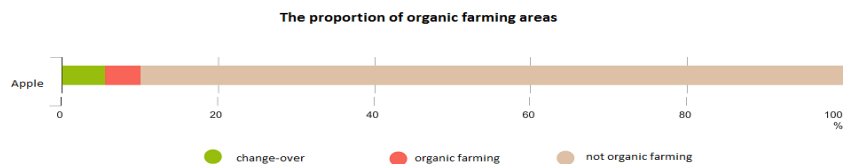
Irrigation methods were also studied in the last year's census by species, where the data on apple plantations also had been highlighted (Figure 7.). The figure illustrates the possibilities of ensuring the irrigability of plantations. According to the census data, less the 40% of Hungarian orchards can be irrigated of which about 57% of the areas have become irrigated.

Irrigation of plantations
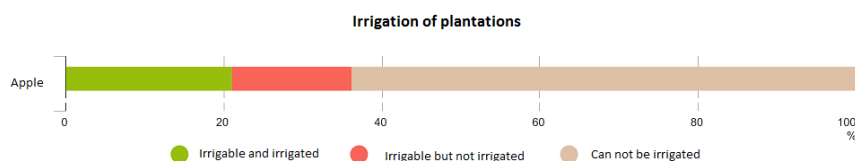
Figure 7.: Irrigation of plantations counties (apple)
Source: KSH

Based on last year's census, it can be concluded that about half of the farmers have at least secondary vocational qualifications on an average nationwide level. Based on statistical data it can be stated that a significant proportion of farmers are over the age of 60 so there is an urgent need to motivate young people in order to involve them in Hungarian agriculture. It raises questions about whether this ratio is coming from the older generation, who are soon to be leaving the sector, or young people [3]. It would also be important to give the knowledge to the younger generation, to be able to combine technology and skills to promote the development of agriculture.

In addition to the vocational qualification, there is an additional problem that the manual labor required for the harvest season has almost disappeared. The current employment situation in Hungary also severely affects the agriculture, so farmers who did not work to modernize their economy faced a serious problem this year because they had to use mechanical labor instead of manual labor for harvesting.

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3 „Gold of Szabolcs"

In Hungary, in 1930, conscious apple production began. In the fifties and sixties, during state-run economy, 12.8 million apple trees were grown in the country and the production grew nearly tenfold. Due to the changes in world markets in the eighties, domestic apple production was also in trouble, but the real crisis was caused by the loss of Soviet exports, which resulted in 40% less land production. State-run farms have become private estates or abandoned lands. In Szabolcs, for example, almost everybody lived on apple production, making it clear for private producers to survive new paths should be sought. The substandard apple would be industrial or concentrate, but at the same time, due to the variety of food products, there was a need for more and more concentrate, many farmers had no interest in growing apples for domestic purpose, therefore there are many aging plantations in the country [23]. Hungarian apple production has been strongly affected for some 20 years (Figure 8). The reason for the significant backlog from Europe and the negative tendencies is that about half of the Hungarian apple plantations are untouched, with low technological and expense levels and there is only 5 thousand hectares of highly competitive plantations [3].
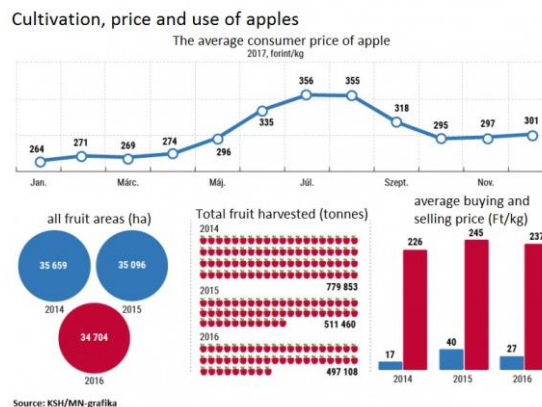
Figure 8.: Cultivation, price and use of apples
Source: KSH

A large part of the Hungarian apple plantation works with trees of 30-50 years old, with anachronistic varieties, traditional technologies, mostly without irrigation [26]. The high industrial apple production is such high only in our country (65-70%). In the EU this ratio reflects just the production of apple juice, while industrial apple is only 30%.

In the past ten years, the average price of 26 HUF / kg of the concentrate reflects the fact that it's not worth much on the market (Figure 9), but it cannot be produced even in industrial plantations at a cost of 25 to 30 forints. In the opinion of professionals, it might be the solution if farmers are to grow apple for domestic

purpose as there are 30% of them, which is suitable for producing industrial concentrate only. Primarily, the weaker plantations are the ones where the apple for concentrate grows, and there is a greater degree of crop rotation as there is no irrigation, no crop control, no professional nutrition farming and no pest control.
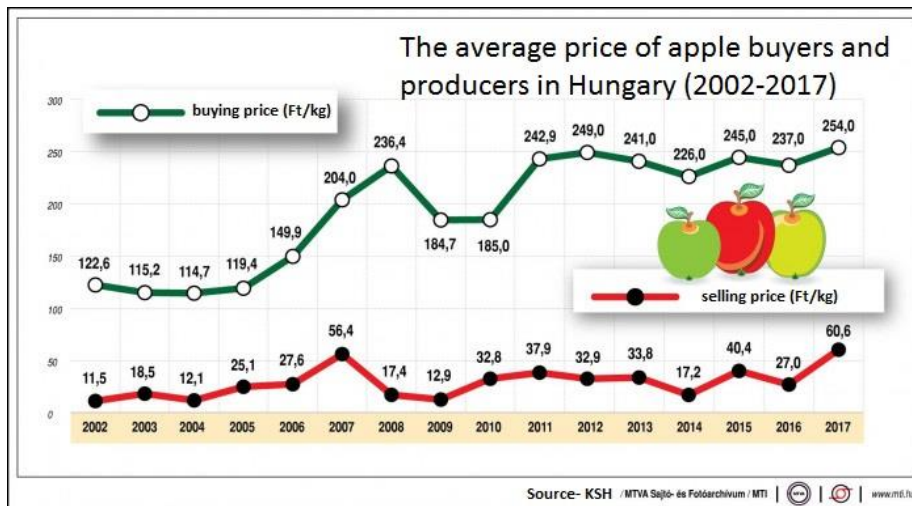
Figure 9.: The average price of apple buyers and producers in Hungary (2002-2017)
Source: KSH

4 Material and Method

On one hand, the study deals with the Hungarian and international literature on agricultural apple production, in particular the agro-specific fields, based on the current problems of agricultural producers, and analyzes statistical data and questionnaires, which may be the beginning of a solution. On the other hand, it presents the importance of networks in agriculture. It draws attention to the importance of co-operation, which can contribute to the knowledge of existing models in international practice.

5 Networking theories

One of the most important scientific topics of the beginning of the 21st century is the network, which is based on the same organizational principle. It is extremely interesting that at the beginning at the 20th century, a Hungarian writer had a great influence on the development of mathematical theories. The six-step distance

theory suggests that anybody on earth can connect with anyone through a chain of acquaintances. The theory is found in Frigyes Karinthy's 1929 Chain links, with five steps. The idea began with the conception of Karinthy. He thought there was enough connection to make the circle of acquaintances of all mankind [10].

Figure 10. Illustration of networks
Source: www.fokusz.info

Laszlo Albert Barabasi and Reka Albert, a research fellow founded the theory of scale-independent network in 1999, which, despite the publication of several independent researchers joined the subject and contributed to the generalization of the theory. Researching the worldwide web has come to the conclusion that, from cells to complex societies, all networks are based on a similar structure-organization principle [4].

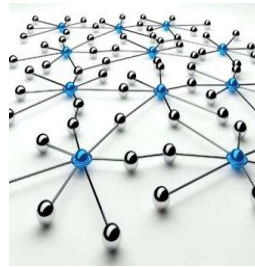Studies on new economic configurations report that the network of companies and their partners is a condition for rural innovation [12]. Increasing globalization, strong multinationalization of food processing and trade, investments, technology and knowledge transfer the network increase in agricultural production [13]. Collective resources, such as the use of infrastructure, greatly benefit the development of economic networks [14]. Businesses can reduce their costs in transactions with geographically close partners and in the field of labour management. The development of local networks efficiently promotes knowledge transfer, innovation and learning process.

The cluster-based economic structure is a general feature of the industry's key business, which is able to produce and sell exportable products outside the region. This industry relies on networks of related business partners in the implementation of production, the vertical structure and processes of the industry are supported and served by the economic infrastructure and the environment [20]. The structure and characteristics of agrarian clusters and the results of competitiveness can fundamentally differ from the national characteristics, the concentration or function of certain participants. Theoretical standardization is somewhere between industry clusters and regional clusters depending on the structure of the cluster and the nature of the activities. Agricultural production may be closer to the conceptual framework of the regional cluster due to its attachment to geographical conditions (e.g. land or other agricultural inputs) [15][17].

6 Network in agriculture

Competitive and sustainable agriculture can be achieved if the innovation is greater than the current one, if we have the skills to do so and the sector is upgraded by investments. Most Hungarian farmers are not able to pay for technology, but this is even less of a problem than having the knowledge to adopt new technologies in their farming. Furthermore, a major problem is that over the next ten years a large number of elderly farmers expected to exit the sector, while agriculture is not attractive to the young and educated workforce due to low income and prestige [30].

Following the apple crisis of 2018, a great number of experts expressed their opinion. According to experts, the development of a modern apple plantation involves a great risk: 15-25 years of payback and 14-15 million forints per hectare. With a cold storage and sorting wrapper this would cost another HUF 10 million, the irrigation would increase the costs by approximately 1 million forints per hectare. The Polish have also resolved this in co-operative form. However, in Hungary the co-operative law is changed every few years, so nothing can be planned for a long term. In the experts' opinion, the solution could be if farmers had at their own fruit processing industry, so they could influence the prices. With this solution, however, the problem is that domestic prices are moved by the international market. In addition, a Hungarian subsidiary of a multinational company owns 65 per cent of processing industry capacity that can be processed on average 500-550 thousand tons of apples per year. The average cost of processing is estimated to reach 1 million Euros, but a significant part of the 25-26 thousand hectares of domestic apple production is found in one of the most disadvantaged regions in Szabolcs-Szatmar-Bereg County. In Poland, farmers in 4-5 villages cooperated and built fruit processing factories, cold storages and at least 20 hectares of plantations. The average yield of Hungarian apple trees in the last three years was 15.6 tons per hectare, while in Poland it reached 34.6 tons per hectare. However, upgrading and higher ratio of apples for domestic use would be a source of new problems as domestic consumption did not exceed 200-250 thousand tons per year, despite all marketing efforts. If the manufacturing capacity did not follow the expansion of production, farmers would come off badly, as there is not much chance for increasing apple exports next to Poland [26].

You have to look at what the majority is doing, so all EU Member States with advanced apple production. Italy, Germany, Austria and the Netherlands produce apples for domestic use, and only 20-30% of the apples will become industrial. These are by-products, so they are not sensitive to the price of their concentrate, as eating is decisive - 90-95 percent of the revenue - so it will not be a disaster if the price is 26 HUF / kg for the concentrate. In our economies where only concentrate is produced, there is a clear sense of price sensitivity. The subsidies maintained these plantations, preserved the uncompetitive structure. There should have been no support given without taking into account professional considerations, and this

is happening now and happened before. It is also unfair to receive the same amount of support as a low-quality producer as a professional. Our support system has to be transformed from 2021, only because substantive elements could be used by then. The aim is to support higher-quality production. There is a need for reform the investment aid. There should be a tendering system that is fast, efficient, viable and focuses on modern farmers and modern plantations. Expertise is also indispensable, there should be professional research and advisory stations, which has practically stopped in our country for 15 to 20 years, a producer who wants to improve, obtains the necessary knowledge from abroad. The only problem here is that foreign knowledge cannot be transposed into one, but it can only be adapted. In that case that there is a support system in which the farmer is interested in, and there is institution that serves him, then he will be happy to improve and build. There is a need for labor as soon as possible because the production of apples for domestic use per hectare requires three to four times more labor than industrial apples. Very important question to solve the irrigation, because it is not economically possible to grow apples without irrigation. If, in ten years time, we do not produce a stable quantity, half of it is industrial, and the other is for domestic use, the Hungarian apple production will go down on the slope from which it is difficult to reverse.

In other sectors, businessmen are already experiencing virtually no chance of survival without joint effort, organization and exchange of experience, so it would be extremely important for farmers to finally realize that farmers should work together if they want to work sustainably and efficiently. Agriculture in Hungary is still not competitive, but if it wants to become competitive, a change of attitude is needed in order to be able to handle the post-2020 support as best as possible. Good use of the funds can contribute, it is still not too late to develop the Hungarian agriculture prosper on its own, being a competitive sector and to remain if the subsidies are no longer available [28].

In order to change the individual, cultural factors, it is of the utmost importance to emphasize why it is worth the cooperation of a region's companies and to choose co-operation instead of competing. It is necessary to share information and relevant knowledge as well as to create a common use of physical assets and other resources, as local entrepreneurs can benefit by combining their resources and can become more competitive and to be able to act more easily on external markets and, on the other hand, they would be able to perform which they are not able to do alone. In addition it can be a further advantage if the public, private and civil sphere jointly take part in the realization of the economic activity [7][19][20][27].

In addition to demand-oriented networking, there is still a great room for supply-led market presence. This is especially true for smallholders, who have the most decisive local conditions and limited resources. This is due to the fact that the social institutions of horizontal integration (co-operatives, producer sales cooperatives (TESZ) and producer groups) play a prominent role in the networking in the European Union [9][16]. Abroad, more and more people

recognize that using such collaboration models can build up common capacities to compensate for the disadvantages and market positions of producers in the agricultural sector, in co-operation with joint management of inputs, capacity utilization and sales channels.

The frequency of different sales connections
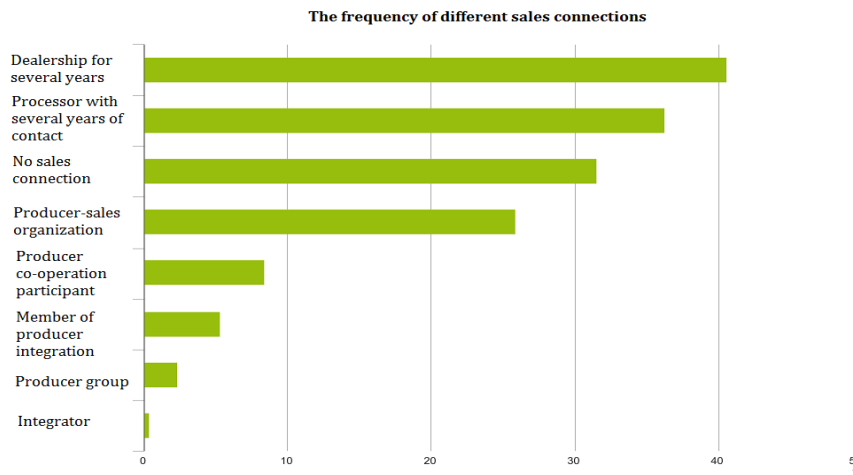
Figure 11.: Sales of agriculture connections
Source: KSH

Last year's census also highlighted the different sales channels, according to which the vast majority of farmers are in contact with or have no connection with a trader or processor. More than one-fifth is a member of a producer and sales organization. The statistical data support that there is an urgent need for the development of network connections.

Many people took positions in many places and provided suggestions on how to avoid a similar situation in the future, that is to say, when the processors want to buy the concentrate on a gratuitously low price. A producer-owned processor, managed by competent management, can operate as a TESZ, in a non-profit manner, not with the aim of generating more profits, but by selling the concentrate on a high price to the farmers; if they sell it on a lower price; of course they would pay less. But we need to acknowledge that a processor itself is not enough to solve this situation. Organization needed around the supply of raw materials, along with its input financing and consultancy.

7 Summary

Up until the Industrial Revolution, agriculture was the dominant sector in terms of value creation and employment. Today, in developed countries, it only accounts for only a few percent of GDP, the agricultural sector is small, as is the low level of agri-employment. While the production of most products and services is only tangentially influenced by the natural environment, the performance of the agricultural sector is influenced by the weather. Some of its products are perishable; such goods appear cyclically on the market. The production cycle is quite long and is inflexible as it is closely tied to real estate (land, farm buildings), so it is very difficult to optimize production by moving the production factors [21].

Farmers have to abolish the "nostalgia" characteristic of Hungarian society, and from somewhere deep, we have to find the "Hungarian virtue" that we have been so often called for. Furthermore, it is necessary to put the bitter hurt aside, to increase trust, to look ahead and to pay attention to the common goal. Without this, economic policy could give Hungarian farmers new tools, but will not be able to use the opportunities of technological development provided by the EU (a new CAP reform) and the sector remains vulnerable.

One of the greatest recognitions of our century is the acquisition of network theories. There are many publications in the literature from general theories to individual fields, but in most cases the networks still exist in theory only. In addition to this, the great technological discoveries efface human relationships; people are less trusting each other, so in addition to the practical penetration of network theories, another major challenge is to strengthen trust. If these artificially generated obstacles can transform mankind and learn to think in networks, success won't keep us wait for a long time.

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An American dream

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Abstract: This study deals with the analyze of manufacturing process of a food packaging material multinational producer company. The case study analyzes the human resources as one of the most important manufacturing management resources in our era. The goal of study is to identify the problems and the potential solutions that lead to a 25% improvement in the company's production performance within a year. The basis of the study lays on the answers given by the company's employees from the manufacturing area provided within the framework of the primary research as well as on the results of the literature research related to this topic. The research identifies the obstacles which stand on the way of the company's performance improvement. It also identifies the essential elements necessary and required for manufacturing and for performance enhancement. The study analyzes from our era perspective the opportunities which are pointing forward, looking into the future and into new approaches. Therefore the study can be thought-provoking and have developing effect on other manufacturing companies too.

Keywords: human resource value of production, human capital, knowledge-based economy, social capital, organizational capital, knowledge management, knowledge-building environment.

1 Introduction

The case study covers the analysis of the production management process of an American multinational food packaging company. In my research, the company's production process as well as the production management functions are investigated to identify the problems and find solutions that will lead to a 25% improvement in company production performance within a year. The research is based on a literature-based primary survey with the employees in the production area. After the introduction, the case study is followed by the literature research, focusing on the resources of production management, especially on human resources. In my study I justify the new approaches of human resource management with multiple literature sources and I highlight the human resource's key role in the production management. With the help of literature, I also present new approaches in the field of management. I continue my study with a

presentation of the problems where I provide details about the company's production management process along with the discovered discrepancies. I continue my case study with the proposals and conclusions, where I reflect on some obstacles in the way of company's performance improvement and where I make several suggestions which I believe would enable the company to expel from its current situation and deliver improvement.

2 Innovative production management

The entrepreneur regards the changes as natural and necessary, and usually the enterpreneur does not bring the change, but always looks for it, responds to it, and exploits it as an opportunity. According to Ducker, this defines the entrepreneur and the entrepreneurial spirit. Searching the change, recognizing it, responding to change, and taking advantage of the change is an indispensable feature in an enterprise. Entrepreneurial activity is typically considered to be extremely risky, which can be risky for success, but does not necessarily have to be that risky. Entrepreneurial activity is risky because there are few commonly named entrepreneurs who know what they are doing, they lack methodologists and violate elementary and acknowledged rules [1].

2.1   Production resources

There are three main things necessary to build an enterprise: creating the capital needed to start a business, creating the financial resources needed to operate and producing and selling the product or the service. The production of a product or a service is the task of production management which mainly means managing the system of converting input resources into products or services. Production management aim is to increase the efficiency of the manufacturing process. Several emerged theories identified that the efficiency of the production process is also influenced by the quantity produced. Various variables need to be taken into account in the manufacturing process for each type of production, such as technical preparation for manufacturing, materials, manufacturing operations, machinery and equipment, plant layout, human labor, management and manufacturing costs [2]. One of the variables of the production process is the human labor. The means of production is the knowledge that the workers own and carry with themselves, workers with special knowledge are crucial for successful organizations. Those with knowledge are providing capital as much as those who provide money. They are therefore equal and depend on each other [3]. 60 years ago the term staff was translated into human resources and today we are talking about human capital management. This is a recognition that people are the cornerstones of the organization as we enter the era of intelligence. The biggest

challenge for the enterprises is the shift from the industrial economy to the knowledge-based economy. The knowledge, skills and attitudes of the workforce distinguish successful companies [4]. Nowadays most companies try to suit their structures, organizations, and styles to their employees [5]. A person ability and willingness to share knowledge creates a value potential. Human capital is therefore a combination of employee skills, motivation and commitment. Human capital is a catalyst that activates intellectual capital forms which improves efficiency [6].

2.2　Production management human resource's value

The management of human capital was called paradigm shift from the traditional staff management approach. Human capital management deals with the acquisition, analysis and reporting of data, which point to the value, added of human capital management to strategic investments and to operational decisions in an enterprise. The main scope of human capital management is to manage human capital and to emphasize that competitive advantage and strategic development can be achieved. Managing human capital by involving and retaining employees through talent management, learning and development programs. Human capital management is an opportunity to gain competitive advantage and the success of the organization is the result of people's competence. Human capital is the sum of accumulated knowledge, skills, experience, creativity and other relevant work attributes. Human capital management aims to create value through people. Competitive advantage comes from the company's specific and valuable human resources, which is difficult to imitate. Individuals possess, use and create knowledge and skills (human capital), creating intellectual capital. Knowledge is a direct competitive advantage for enterprises. The explicit knowledge can be encoded, recorded and stored. The tacit knowledge exists in people's mind by personal experience gaining and is hard to record in written form. Transforming tacit knowledge into explicit knowledge is the biggest challenge in knowledge management. The competitive advantages of the organization lies in organizational knowledge and not on how is positioning itself on the market. The ability of the organization to gather and effectively use knowledge will be a major source of many competitive advantages in the coming years. A successful company is a knowledge-producing company [7]. The environment is changing and in many ways, in an unprecedented way. The change is constant and fast. What can management do to prepare for change? What kind of changes are there in front of us? What other management paradigms can still emerge? The knowledge is the most important resource of society and knowledgeable workers as the dominant group of the labor market. The new knowledge-based society relies heavily on knowledge workers. That is why we can say that knowledge workers are new capitalists. Knowledge becomes the key resource and the only scarce source. This means that the workers possess the production tools. The new

knowledge-based society is the first human society where there is no limit to the potential of upward mobility. Knowledge differs from all other sources of production resources because it is not inheritable and cannot be given into legacy [8]. Acquiring and possessing knowledge is especially valuable for companies which are producing specific and unique products or services. The repetition of the process steps required to produce a product leads to reduction of time spent on performing the process steps and thus results in an increase of product amount produced during a given time unit. The learning curve is an indicator for measuring the repeated workflow step performance. The indicator takes into account the unit's production time, the number of units per unit time, the unit cost of production and the percentage of inadequate units. A shorter time spent for a good quality product is more productive for a company. Human resources with good process knowledge increase the efficiency of the company [9]. Similarly to the learning curve, learning by doing theory shows that the workflow step is a catalyst for gaining production experience. The result of experience gaining is productivity and human capital increase [10]. An adequate response to production workflows depends on the experience and practice of human resources. Not all workflows can be clearly defined, there are processes which can and cannot be encoded. The uncodeable processes cannot respond to the environmental changes. In such cases, only human labor is able to intervene and conduct the process, therefore these are human-conducted processes [11].

2.3 The management of production human resources

Based on concepts management deals with business, with organizational structure and with the management of people. Furthermore, the basic of management practice, is the technology, the market and the particular customer. New paradigms override these concepts. According to the new approach, management is a unique and distinctive body of the organization. Management is not just managing people; it is leading their strengths and knowledge to make them more productive. In the new approach neither the technology nor the customer can be an adequate basis for the management strategy. The management must start with strategy based on customer value and customer decision. [12]. Good management recognizes that leading is about when and in which direction. The timing is often the key between success and failure. Wrong decision at the wrong time leads to disaster. A good decision at the wrong time creates resistance. Good decision at the right time is a success. Good leaders have a good timing capability. When the good leader and the right timing match, incredible things happen in the organization. Then the organization achieves its goals, gains its incredible rewards and gains momentum [13]. It is most likely that management can be the most important innovation of our time. Management is a special organ of the organization. The management keeps the organization up and running. Management represents status and position as well as social status, power,

discipline and development. Management is a task, management is a discipline and management means people, human beings. Management enables people for performance, management makes their strengths effective and to make their weaknesses irrelevant. An organization consists of people with different skills and knowledge who are doing a lot of work. All members must think what they want to achieve and make sure that everyone knows and understands the goals. In itself, neither the delivered quantity nor the financial results are adequately reflecting the performance of the management and the organization. Market situation, innovation, productivity, people's development, quality and financial results are vital to the organization's performance. However the only most important thing about an organization is that the results exist only from the outside. The result of the organization is a satisfied customer. Within the organization, there are only costs. All the managers who understand this and lead accordingly will be successful managers [14].

2.4 Innovative production management

Innovation is a performance indicator of the organization. We can define innovation as an idea, a notion, a practice or an object that an individual views as new or perceives it otherwise. The perceived novelty of the idea determines how the person responds to it. If the idea seems new to the individual, that is an innovation. Innovation does not only cover the functionality of products and processes which is called "hard" innovation, but also the perceived attractiveness and aesthetics of products and processes which is called "soft" innovation. Therefore innovation can be the presentation of an existing idea or approach when it is perceived as novelty. New ideas or new approaches to existing problems or the recognition of new opportunities using new approaches is an innovation. So innovation is the idea of solving a given problem and achieving results [15]. The productivity and growth of countries depends rather on the renewal of human resources and production factors, on the ability to create new knowledge than on the abundance or lack of natural resources. It is most likely that out of all productive assets which determine economic growth intangible assets and intellectual property are increasing [16].
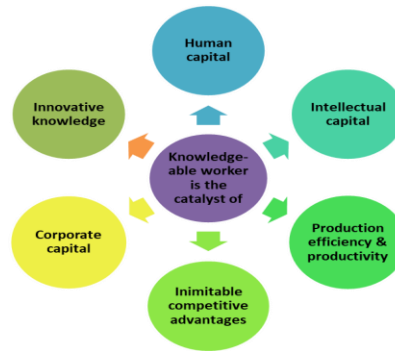
Figure 1 The value of knowledgeable worker
Source: Own editing

3 The stating of the problem

At the end of the 50's, two engineers were working on the production of a wallpaper when they accidentally invented the bubble wrap. The enterprising engineers realized its potential and reacted to it. This entrepreneurial spirit defined the beginning of the company, the beginning of an American dream. Today the company is built up of three main divisions. Among thousands of employees across the world today 600 scientists and engineers work for the company. The company has 49 laboratories, 94 manufacturing facilities, 3 international innovation centers and owns 2600 patents and 4200 trademarks. One of the manufacturing sites is located in Hungary and has been a part of this fantastic dream for nearly 10 years. In recent years, however, something has happened and the company does not and cannot achieve the expected production performance and operates with half of its capacity.[13] The Hungarian company is one of the largest finished goods producer of the mother company in Europe and plays a significant strategic role in the company's European and Global organization. A few years ago the mother company made impressive investments in increasing the number of technologies as well as invested in the modernization of technologies in the Hungarian factory to meet the market demands.

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[13] The manufacturing ability drastically decreased and the production volumes are transferred to other sister sites. The volume produced at low capacity level does not meet the expected quality. The internal production scrap both in value and quantity had seriously increased. The timely production has reached a very low level.

3.1   The scope of my study

The purpose of my study is to investigate the company's production process and its production management capabilities to identify the problems and find potential solutions that improve the company's production performance by 25% within one year. The company's production process and process management investigation and the solutions identified mainly aim to improve its manufacturing performance, but it can also provide guidance for other manufacturing companies. As the study deals with human resources being one of the most important production management resources today, it can be thought-provoking, developing, and forward-pointing for other companies as well. The study also presents new approaches of human resources and management in our era.

3.2   The method of research

My study relies first of all on the literature, which demonstrates the essential role of production management in achieving performance of a productive company. The literature emphasizes the principles of human resource management in our era, highlights its new status and the impacts of the human resources on the company's performance. The study is also based on primary research with employees in the production area.

3.3   Determination of the problem

As mentioned above, the mother company made a significant investment in the Hungarian subsidiary. The investment and development also indicate the significance and the key role of the Hungarian subsidiary in the whole company's organization. It also shows that the mother company has big plans for its Hungarian subsidiary as a continuation of this amazing American dream. The Hungarian factory produces unique, small and medium of production series of finish goods. The production processes are documented for each type of technology and for all types of products. But not everything can be documented. The technologies are non-automated. The human workforce is required to start, conduct and complete the production process. Today without human resources and especially without knowledgeable resources the company does and cannot deliver the production goals. At this company the human resource is the Alfa and Omega of the production processes. Without human resources, the company cannot perform its core business. The production process is strongly human resource dependent. First of all, I note that the unfavorable change started in about 2015 when the Hungarian labor market changed perhaps like never before due to high emigration and the increase of the aging index. The situation of the Hungarian labor market had a strong impact on the human resources of the company with its unprecedented low unemployment rate and with its strong labor hunting nature. In

such labor market environment there is a real struggle for workers with skills and knowledge. The management of the Hungarian subsidiary did not recognize the change therefore did not react to change, at least not with an entrepreneurial spirit. The lack of proper reacting to a change on the labor market is very risky particularly when the production processes are rather human-conducted. The experienced human resources with good process knowledge is needed to react to all production environmental changes which cannot be formulated in the standard operational procedure. On average, four months of intensive learning is required to acquire the basic manufacturing process and the technology operational knowledge. And an average of ten to twelve months of learning by doing is required to deliver a quality manufacturing process. The human resources have a key role in the company's production process. The company's production process depends on human resources, especially on the knowledgeable human resources. Human resources have an impact on the manufactured quantity and on the quality of the manufactured products. All human resources factors create serious constraints in the production process of the company. Therefore losing experienced and knowledgeable workers leads to high risks in achieving the production goals. In the present circumstances, human resource capacity planning is the most critical element of the production management process. It is, thus, very difficult to plan the human resources capacity and, as a result, the production outcome cannot be ensured. The human workforce, being variable, is the most critical resource of production process and it is one of the biggest challenges of the production management. Knowledgeable human resources represent value which has to be recognized by production management. The significance of knowledge of human resources could never be as obvious as today. Perhaps it has now reached its heyday! I can illustrate the current situation of the company with the story of the wandering in the desert. I experienced the moment when the path opened up to the development and growth similarly to the biblical story when the Red Sea opened up in front of the fleeing people. The Hungarian factory has been wandering aimlessly in the desert for several years by now. During this the company has gone through many trials and lost many knowledgeable people. The longer time spent lost in the desert, the higher the loss will be. The sooner the company gets out of desert and reaches its goals, the land of Canaan, the land of its dreams the better.

Conclusions

In my study I examined the production management process of an American multinational food packaging producer. The mother company made significant investments both in terms of technological upgrading and number of technology in the Hungarian plant. Based on its market forecasts and the previous results of the Hungarian company, the mother company decided to give the Hungarian subsidiary a key position in its Supply Chain. The performance of the Hungarian company has deteriorated dramatically over the past years and is currently producing with half of its capacity. During my research I have found that the

human resource is the Alfa and the Omega of the production processes. Without knowledgeable human resources the company cannot perform its core business. I also found that the changes in the Hungarian labor market unexpectedly shook the company and caused serious damage in its performance. I found, furthermore, that knowledgeable human resource is one of the most valuable resources of our times. The knowledgeable workers are the new capitalist of our times! Today we live in the era of knowledge boom. Knowledge has reached its heyday. Human resources management should be in the focus of all companies especially where the processes are heavily human resource dependent. I have two recommendations for the company. I propose the company to build a local knowledge-based economy in order to increase productivity, to create the inimitable competitive advantages and to improve the production performance. I also recommend the company to consider the new wave managerial approach of making people capable of achieving performance and of making their strengths more efficient and their weakness irrelevant. I strongly believe that in this way the company can reach the goals and can soon get out of the desert and reach the land of Canaan, and continue to be the part of this remarkable American dream.

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Sustainable development in reflection of the laboratory market

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Abstract: The purpose of this study is to present a brief analysis of the most important aspects based on the R&D sector's activities, targets and background. Furthermore, the efficiency of the use of Hungarian and EU development resources will be examined as well as the social, economic and ecological analysis of the sustainable development with the supporting cooperation of the industrial laboratory market. In the 20th century, as the result of accelerated growth of production and consumption, the increased utilisation of natural resources and the fast growing of population which exponentially escalated the extraction of resources posing an intensified threat to the sustaining capability of the environment. In this work only the most important aspects based on the Research and Development activities were examined by multivariable statistical methods for sustainable economic development. Naturally, the conceptual scope and extent of this study do not permit all the possible issues to be examined from every aspects, thus it will be endeavored to point out merely the most relevant considerations.

Keywords: sustainable development, Economic growth, research and development, importance of Hungarian and EU development resources, statistics

1 Introduction

Social and economic importance of natural resources is unquestionable at all times from the aspect of humanity. „Efforts to satisfy the constantly changing demands for quantitiy and quality accompanied human history as an essential motivational factor." [1] For decades the reasonable management of natural resources has an emphasized function in the social and economic procedures. In the early periods of economics natural resources were considered as permissible goods exposed unlimitedly to the society. As a consequence of the intensified production and growing consumption in the 20th century, the accelerated pace of population growth increased the utilization of natural resources exponentially and meant more and more enhanced threat to the sustaining ability of the environment. Society and mainly economy intensifies intervention into nature caused irreversible processes in many cases. Economical management of resources against wasteful and careless utilization became an essential topic on corporate, national, regional and global levels. United Nations in its many programs pays particular attention to key questions related to sustainable development such as the decreasing of the emission of greenhouse effect gases, protection of forests, saving and caring of biological diversity [2].

Sustainable development as a concept – following the UN Brundtland report dated in 1987 – became widely popular at the end of the '90s. The Brundtland report – Our Common Future – defines sustainable development as follows: Sustainable development is a sort of development which ensures the satisfaction of present generation's demands without the threat of endangering future generations' chances to satisfy their demands [3].

1.1   EU R&D trends

Globalisation and the challenges of a new knowledge-driven economy required radical transformations of the European economy set by the Lisbon Strategy in 2000. R&D fundings is one of the major instruments for steering the science system. In 2002 the European Council defined the objective of 3% of GDP allocated to R&D spending with more focus on economic growth, using guidelines laid out in the Frascati manual, published by the OECD.

An empirical analysis of 2007 working with the database of Eurostat, based on the actual spending on R&D by the main sectors, business, government and higher education as well as the Gross Domestic Expenditure on R&D (GERD: including the private, public and academic expenditure), reveals that none of the EU Member States (EMS) complied with the 3% R&D target set by the Lisbon Strategy, with the exception of the Scandinavian countries, Finland and Sweden. Furthermore, it points out the differentiation among the Western, the Mediterranean and the New Member States. The average GERD expenditure for

the Euro zone countries is higher than in the Non-Euro ones, except for the government share of total GDP on R&D, shown in Fig.¬ 1.

	Euro Zone	Non-Euro Zone
Over 1% of GDP on private R&D	Finland, Austria, Germany, Belgium, France, Luxemburg	Sweden, Denmark, United Kingdom
Under 1% of GDP on private R&D	Netherlands, Slovenia, Ireland, Spain, Portugal, Italy, Greece	Czech Republic, Estonia, Hungary, Malta, Romania, Latvia, Slovakia, Poland Bulgaria, Cyprus

Figure 1 GDP on Private R&D for Euro- and Non-Euro-Zone
Source: Albu, N. (2011) Research and Development spending in the EU

In analogy to this, the European Union's latest growth strategy, Europe 2020, called 'An European strategy for smart, sustainable and inclusive growth' contains targets for public and private R&D investment in order to provide a stimulus EU competitiveness, as the main objective of country's development, with the key indicator of efficiency set to ensure the strategic goal of 3% of GDP. Several studies have already examined whether these policies are paying off, whether they redeem these hopes. Some of them suggest that globalization, that is to say the global integration of value chains, has had a far greater impact on the knowledge-based progress of the CEE countries' economy than "Europeanization".[14]

According to the publication of Gorzelak (2016) the 2014-2020 period could be the final phase of substantial Cohesion Policy (CP) transfers to the CEE, and this programming period has an increased focus on innovation and R&D support. It was also stated in the work of Gorzelak (2016) that a comparison of thematic shifts in funding from 2007-13 to 2014-20 shows a significant increase in CP allocations to R&D and innovation. It is crucial for CEE Member States that funding is used effectively for sustainable growth. The experience of EU15 countries is that the 'added value' of CP was highest in the third phase of funding.

In the international literature there are many studies which are examining the linkages between R&D expenditure and economic growth. Most of the studies are conducted on developed countries.

Tiryakiouglu (2006) analysed the relationship between R&Đ expenditure and economic growth on selected OECD countries by causality analysis since 1970s.

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[14] Innovation in Hungary – The Impact of EU Accession and Integration into Global Value Chains
"We contend that globalization (global value chain integration) has more effectively contributed to Hungary's knowledge-based upgrading than Europeanization"

This study reveals that there is causality relationship between them and it emphasizes the importance of technology for economic growth.

Genc et al. (2010) evaluated the linkages between R&D and economic growth for 34 countries using panel casuality model. Findings based on annual data from 1997 to 2008 demonstrate that there is a unidirectional causal relationship running from R&Đ to economic growth.

Gulmez et al. (2012) investigated the long run relationship between R&D expenditures and economic growth in 21 OECD countries from 1990 to 2010 by utilizing the Pedroni and Kao panel cointegration model, Pedroni DOLS and FMOLS Canning-Pedroni causality model. The study presents a strong cointegration relationship between R&D expenditures and economic growth in the long run.

Ozcan et al. (2014) analysed relationship between R&Đ expenditure and economic growth 15 OECD countries over the period from 1990 to 2011 within the framework of panel data model. The results show that R&D has positive effect on economic growth in the selected countries.

Additionally to these studies, Inekwe (2014) analysed the role of R&D spending on economic growth in sixty six developing economies between 2000 and 2009. Countries were grouped into two categories: upper middle income economies and lower middle income economies. The results show that it has a positive impact of R&D spending on economic growth in case of developing countries. The effect of R&D spending on economic growth is beneficial in case of upper middle income economies while insignificant in case of lower middle income economies.

2 Materials and methods

The aim of the present thesis work is to examine the presence and role of the laboratory equipments, instruments serving the rapidly changing needs of domestic industrial and clinical laboratories. The laboratory industry is extremely sensitive to ecological problems. The high-tech analytical instruments are mainly responsible for carrying out industrial and chemical tests in the fields of environmental protecion, air pollution, agriculture, food safety, mineral oil industry, water management, biotechnology as well as pharmaceutic.

In the study all available, relevant information, data was gathered concerning sustainable laboratory scientific R&D activities and its necessary adherent background, such as R&D expenditure, researchers' headcount, number of institutes as well as scientific sustainable education.

Research and Development (R&D) spending on innovation, through the measurement of research in laboratory field, based on the impact of science for

optimizing laboratory operations. R&D spending, Gross Domestic Expenditure on R&D (GERD) is one of the key Europe 2020 strategy indicators, the ratio of GERD to GDP also known as R&D intensity, which constitutes the source of long run endogenous economic growths. The level of GERD has been increasing modestly since 2006 within the range of 1.76% - 2.04% in EU-28 Member States, set back by the financial and economic crisis (2008-2009) led to deep cuts in funding for scientific research [4]. Scientific research is largely carried out in universities and academics labs, which generally run under heavily constrained state budget. The support level of the research activity varies from country to country. In Hungary, research work is characterized by low state and industrial support and cooperation. The research and development expenditure is below 1,4% of GDP, which is far beyond the average 2,15% in the EU 15 most developed members, shown on Figure 2, not to mention the USA reaching almost 3% of R&Ð costs.
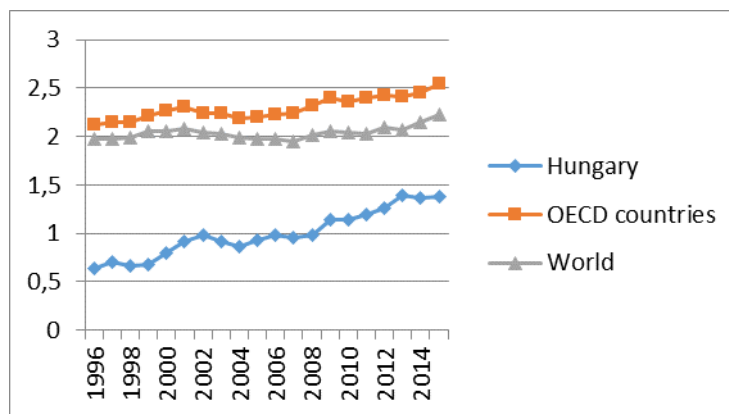
Figure 2 Research and development (R&D) expenditure as a percentage of GDP
Source: own construction based on IMF

According to the main statistical findings GERD stood at EUR 303 billion in the EU-28 in 2016, which showed a slight increase of 0,4% on the year before and 40% higher than 10 years earlier, in 2006, despite the reduction in R&D expenditure in 2009 during the global financial and economic crises. Only in two Member States (Sweden and Austria) were R&D intensity recorded to be over 3% in 2016, while for nine New Member States that joined the EU in 2004 or more recently, level stayed below 1%. The majority of R&D expenditure was generated in the business enterprise sector, where the expenditure rose from 1.12% of GDP in 2006 to 1.32% by 2016. Followed by the higher education, reaching 0.47% of GDP. While the other two remaining sectors, the government sector (0.23% of GDP), and the private non-profit sector (0.02% of GDP) changed slightly throughout the examined period. In 2011, the European Commission presented the 7th framework programme for investing almost EUR 80 billion in research and innovation by announcing Horizon 2020. (Eurostat statistics, 2018 March)

In Hungary, grants paid from EU Structural Funds related to the 'Science and Innovation Program' of the New Szechenyi Plan, co-financing innovation activities was EUR 680 millions over the period of 2010 to 2013. One of the most important components of innovation-specific EU-funds supports higher education institutions' research and research infrastructure development expenditures.

Figure 2. indicates that the amount of support allocated to foster research, development and innovation activities have considerably increased over the surveyed period of 1996 to 2015. Performance by the main input indicator of GERD, definitely started to converge to those of established EU economies (Szalavetz, 2014).

3 Methods

The aim of the current study is to highlight the main factors and define the strengh and nature of relation among the main variables in R&D field. In order to fulfill the aim of the research several statistical analysis were being carried out in the field of scientific research.

The work gives an overall survey on the local Hungarian R&D segment by taken the below factors into consideration for a deeper market analysis.

The current paper provides a better picture on the R&D facilities in our local laboratory market, by listing the numbers of institutes divided into sectors.

The increasing numbers of Hungarian research institutes will be calculated by Constant-based dynamic ratio to demonstrate the increasing trend in the period of 1990 to 2016.

$$b_k = \frac{y_k}{y_0}$$

(1)

R&D Headcounts were added to number of R&D Institutions in the above mentioned calculation by sectors, inspecting Correlation and Linear Regression among the variables.

Pearson correlation forms the bases of more sophisticated analizes like multiple regression and factor analyses. Performing a Pearson correlation, means that the hypothesis is one variable is associated with another variable and that can be a positive or a negative correlation. Pearson correlation is a method of estimating the association between two variables that are scored at an interval- or a ratio-level.

Furthermore to gain a complex picture of the present status of Hungarian research and development background, Linear Regression was processed in consideration

of the strengh of relationship between total R&D staff as a percent of total labour force and R&D expenditure as a percent of GDP.

Year	Total R&D staff as a % of total labour force	R&D expenditure as a % of GDP
1990	0,81	1,6
1991	0,63	1,07
1992	0,57	1,05
1993	0,58	0,98
1994	0,59	0,89
1995	0,54	0,71
1996	0,55	0,63
1997	0,57	0,7
1998	0,56	0,66
1999	0,56	0,67
2000	0,61	0,79
2001	0,59	0,91
2002	0,61	0,98
2003	0,59	0,92
2004	0,59	0,86
2005	0,6	0,92
2006	0,66	0,99
2007	0,66	0,96
2008	0,71	0,98
2009	0,79	1,14
2010	0,84	1,15
2011	0,9	1,19
2012	0,93	1,27
2013	0,98	1,39
2014	0,91	1,36
2015	0,88	1,38
2016	0,82	1,22

Figure 3 The main ratio on R&D

Source: Own edition based on the Hungarian Statistical Office, Statistical tables on R&D

One of the further scopes of the study is to examine the source of the total R&Đ expenditure's sources in Hungary by the main sectors by Factor Analysis method. Efficiency in itself has not always been in the foreground of public thinking concerning EU fundings. "The European Council and then the European Parliament adopted the regulation on the seven-year financial framework for the European Union on November 17, 2013 [5]. This was a smaller budget in both real and nominal terms than the previous seven-year framework. The reduction of the budget as well as a more stringent spending approach due to the effect of the

economic crisis shifted the conditions governing the 2014–2020 framework towards more efficient use." [6]

EU resources for innovation with a fairly poor level of efficiency can certainly be supported by calculations, and moreover this is deemed the worst among the Central and Eastern European, former Socialist countries.[15] Naturally, by upgrading efficiency, a new consideration came to the fore which, although it was present before, had carried far less weight than it does now.

In order to fulfill the multivariate statistical method concerning the quantitative data by factor analyses to define the observed variables into fictive common groups, correlation as one of the main basic conditions of Factor analyses is to be seen in Correlation Matrix with relatively highly correlated interpreted variables, especially for Foreign, EU fundings sources as well as business sources followed closely by governmental sources.

Depending on the method used the common background variables are called as principal components (principal factors) or factors and it is assumed that they are supposed to be independent).

In the case of factor analysis it is hypothesised that by the help of q<p background variables a considerable part of the variance of the original variables can be explained and the rest of the variance of the observation variables can be considered as a specific effect (Figure 3) (Szelenyi, 2002).

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[15] Innovation in Hungary – The Impact of EU Accession and Integration into Global Value Chains

"Hungary is one of the worst performers with respect to the efficiency of public investments in innovation. Montalvo–Moghayer [2011] computed innovation system efficiency indices; that is, input/output ratios of R&D efforts. According to their calculations, Hungary had one of the least efficient innovation systems, while the Czech Republic enjoyed the best performance among CEE economies." http://real.mtak.hu/18116/

Model of factor analysis
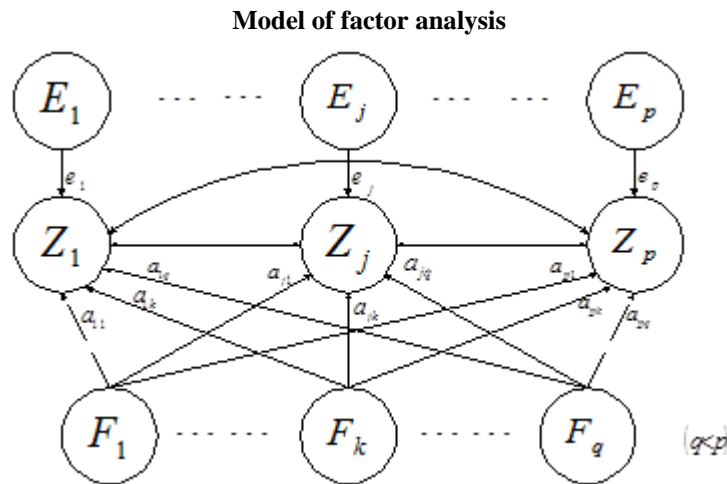
Figure 3 Model of factor analysis
Source: Szelenyi, 2002.

3.1 Hypothesis

Hypothesis are being set along the survey to provide wider picture overview of the R&D intensity concerning Hungary in the last decades. Hypotheses are being carried out to determine whether the following statements are veridical or not concerning the context of the topics.

1. Researchers' headcounts have been increasing intensively in the last three decades, since 1990.
   The null (H0)- and H1 hypothesises were ascertained as follows:
   H0= The statement is acceptable. There is only positive relation in all sectors (University, Academic, Business).
   H1= The relation is not positive in all sectors. There can be also negative relation.

2. There is a strong correlation R&D expenditure as a percent of GDP; Total R&D staff as a percent of total labour force.
   H0= R&D expenditure & R&D staff are strongly depending on each other.
   H1= There cannot be found strong correlation between the two variables.

3. The distribution of R&D expenditure is even among the different sectors.
   H0= R&D expenditure is evenly distributed among the sectors.
   H1= The distribution is not even. There are higher and lower sectors concerning R&D expenditure distribution.

4 Results

4.1 Research Institutions

The growing number of research sites and institutions, founded by university education, could provide a strong background of economic growth. All of them are the basis of innovation technology supporting industrial economic growth for a sustainable welfare for the future. Open Innovation plays a major role in the field of laboratory. The main aim of the laboratory instruments producers and their representatives is to creat more innovation and profitability in the high technology of the equipments. As the laboratory market is a rather highly scientific segment crowdsourcing for products ideas can not be common, rather there is an intensively growing tendency of open innovation collaboration through partnership with other manufacturers. Also a high number of acquisitions can be experienced among manufacturers for open innovation as well as professional associations.

According to Figure 4 the number of research institutes has more than doubled itself since the following year of the regime-change, after 1989, which is also explained by the constantly yearly rising R&Đ expenditure in percentage of GDP, trying to catch up with the world average, shown in Figure 2 to provide basis of innovative technology for R&Đ activities in Hungary.

Table 4: R&Đ institutes in Hungary (1990-2016)				
	y	Of which		
	No.of R&Đ Institutes	Academic Institutes	Universities Institutes	Business enterprises	Percent of change
1990	1256	142	940	174	100,00%
1991	1257	133	1000	124	100,08%
1992	1287	118	1071	98	102,47%
1993	1380	124	1078	178	109,87%
1994	1401	112	1106	183	111,54%
1995	1442	107	1109	226	114,81%
1996	1461	121	1120	220	116,32%
1997	1679	131	1302	246	133,68%
1998	1725	132	1335	258	137,34%
1999	1887	130	1363	394	150,24%
2000	2020	121	1421	478	160,83%
2001	2337	133	1574	630	186,07%
2002	2426	143	1613	670	193,15%
2003	2470	168	1628	674	196,66%
2004	2541	175	1697	669	202,31%
2005	2516	201	1566	749	200,32%
2006	2787	208	1552	1027	221,89%
2007	2840	219	1496	1125	226,11%
2008	2821	195	1471	1155	224,60%
2009	2898	197	1394	1307	230,73%
2010	2983	190	1409	1384	237,50%
2011	3000	188	1380	1432	238,85%
2012	3090	131	1376	1583	246,02%
2013	3159	130	1317	1712	251,51%
2014	2994	136	1288	1570	238,38%
2015	2801	135	1253	1413	223,01%
2016	2727	125	1311	1291	217,12%
Forrás: https://www.ksh.hu/docs/hun/xstadat/xstadat_eves/i_ohk002a.html				

Figure 4 R&D institutes in Hungary (1990-2016)
Source: Hungarian Statistical Office, Statistical tables on R&D

In the last column the increasing numbers of institutes were calculated by constant-based dynamic ratio method for the period of 1990 to 2016.

The number of research institutes more than doubled with an intensively expanding business sector, became seven times more - like in the United States and Western European countries regulated by free market - since the regime change in Hungary. Unfortunately the governmental non-profit sectors, such as university and academic fields remained around the same level over the examined period due to insufficient governmental and private financial support. Furthermore, it can be stated that the distribution ratio of the researchers' staff in percent of total labor does not indicate such positive difference as it is experienced in the business field and the ratio represents low percent of 0.8% in 2016, which was almost the same in 1990, although we could experience some falls below

0.6% during the nineties. It can be determined that private business industrial sectors should invest more in non-profit sectors in the aim of receiving higher quality research as a mutually beneficial compansation in order to support economic sustainability.

	No.of R&Đ Institutes	Of which			R&Đ headcounts	Academic headcounts	Universities headcounts	Business enterprises HC
		Academic Institutes	Universities Institutes	Business enterprises				
1990	1256	142	940	174	59723	19802	22787	17134
1991	1257	133	1000	124	51218	16598	22607	12013
1992	1287	118	1071	98	43879	13749	22296	7834
1993	1380	124	1078	178	40999	11886	22029	7084
1994	1401	112	1106	183	39810	9966	21765	8079
1995	1442	107	1109	226	38088	9312	20699	8077
1996	1461	121	1120	220	37286	11015	20085	8186
1997	1679	131	1302	246	39626	10781	22434	6411
1998	1725	132	1335	258	41317	10174	24750	6393
1999	1887	130	1363	394	42088	9995	24411	7682
2000	2020	121	1421	478	45325	11255	25972	8098
2001	2337	133	1574	630	45676	10461	26543	8672
2002	2426	143	1613	670	48727	11767	27532	9428
2003	2470	168	1628	674	48681	11747	27769	9438
2004	2541	175	1697	669	49615	11483	29262	8870
2005	2516	201	1566	749	49723	11627	28702	9394
2006	2787	208	1552	1027	50411	11498	27165	11748
2007	2840	219	1496	1125	49485	10429	25923	13133
2008	2821	195	1471	1155	50279	9996	26240	14043
2009	2898	197	1394	1307	52522	10100	25934	16488
2010	2983	190	1409	1384	53991	10293	24778	18920
2011	3000	188	1380	1432	55386	10156	24404	20826
2012	3090	131	1376	1583	56486	9541	23647	23298
2013	3159	130	1317	1712	58237	9309	23112	25816
2014	2994	136	1288	1570	57185	9379	22447	25359
2015	2801	135	1253	1413	56235	10531	21998	23706
2016	2727	125	1311	1291	54636	9318	21969	23349

Figure 5 R&D Institution & R&D headcounts

Source: Hungarian Statistical Office, Statistical tables on R&D

First the number of R&D institutions and Headcounts Means and Standard Deviation information were to gained by Descriptive Statistics. The mean of the institutions is 2266 with a standard deviation of 673, while the number of researchers are 48764 with a deviation of 6634. All variables have positive ratio with the other variable, excepted Academic headcounts, which has negative correlation with all other variables. Among interpretation variables the association are weak, so multicollinearity does not exist.

Hypothesis 1.

Researchers' headcounts have been increasing intensively in the last three decades, since 1990.

Analysis has been carried out whether there is any correlation between the total number of R&Đ institutions and the total number of R&Đ Headcounts in Hungary. It can be stated that there's a strong relationship among R&Đ institutions and their headcounts. Linearity was also assumed therefore graphical visualization has been displayed as well.

Furthermore the influence of the independent variable, the number of R&Đ institutions has been detected on the dependent variables, such as Academics, Universities- as well as Business enterprises R&Đ headcounts by Regression, thus the fit test for the assumped linear relationship among the variables were inspected by Regression Curve Estimation. Strong, positive correlation is inspected among the number of R&Đ institutions and the business enterprises headcounts and slightly positive relationship is detected by the Universities' headcounts, whereas negative correlation is experienced among R&Đ institutions and Academic R&Đ headcounts, which is also corroborated by the the Graph.

4.1.1 Results for Business Sector

Figure 6 Result of Linear Regression for Business Sector

Source: Own edition, based on Hungarian Statistical Office, Statistical tables on R&D

ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Regression	516031863,841	1	516031863,841	21,423	,000
Residual	602195405,121	25	24087816,205		
Total	1118227268,963	26			

Figure 7 The independent variable is No. of R&Đ Institues.

Source: Own edition, based on Hungarian Statistical Office, Statistical tables on R&D

ANOVA is an Analysis method of Variance, investigates the independent variables effect on the dependent variable by comparing means. F-probe is used for testing H0 hypothesis, which states that the categories' means are equal, when

F is 1. F is greater than 1 means, that the independent variables are significantly effect the dependent variable, thus the H0 hypothesis is rejected.

The two basic condition of the variance (ANOVA) analysis is the following:

• Variables are to have normal distribution: unstandardized residuals eaxamination for normality by groups

• Homogenity of groups variance (Levene-test for Homogenity Test)

In the diagram below the alignment of the regression line to the point set is illustrated. Linearity can be observed clearly, which refers to a strong, positive relationship between the variables observed.

In the current examination carried out by ANOVA method, F (the proportion of squares 'Between Groups' and 'Whithin Group') represents 21,423 at 0,00 significancy, which is lower than 0,05 significant-level, thus the null-hypotheses is rejected. The number of R&Đ Institution significantly effected the Headcounts at Business Enterprise R&D sectors. The examination is also significant by the t-test with 4,628 at a 0,00 significant level, lower than 0,05.

Coefficients

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
No. of R&Đ Institues	6,620	1,430	,679	4,628	,000
(Constant)	-1687,613	3375,976		-,500	,622

Figure 8 Coefficients
Source: Own edition, based on Hungarian Statistical Office, Statistical tables on R&D

Regression equation (y=bx+a) can be deduced from the unstandardized coefficients from the above figure.

Headcounts (No.)= -1687+6620*No. of Institution
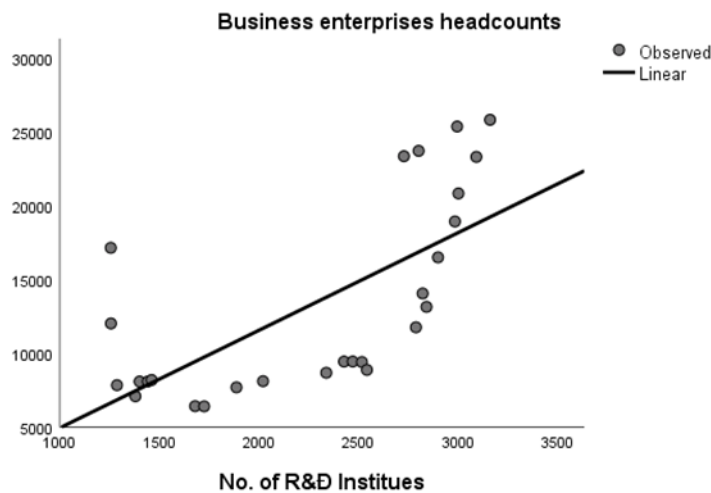
4.1.2 Results for University Sector

Result of Linear Regression for University Secor
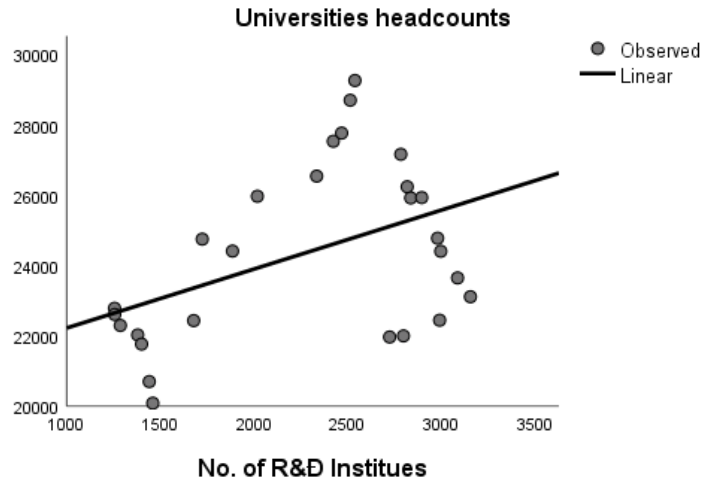
Figure 9

Source: Own edition, based on Hungarian Statistical Office, Statistical tables on R&D

Model Summary

R	R Square	Adjusted R Square	Std. Error of the Estimate
,450	,202	,171	2280,083

Figure 10 Result of Linear Regression for Academic Sector

Source: Own edition, based on HSO, Statistical tables on R&D

Pearson correlation coefficient is 45%, while determination coefficient ($r2=0,202$), which examine the strenth of the relationship, means that the regression equation explains the 20,2% of the total variance.

F-probe, which prove the existance of the relationship, is 6,346 at sig.level of 0,019, $p<\alpha$ (0,05) is significant, so the Nullhypothesis is being rejected. There's significant correlation between the variables. So as T-test with value of 2,519 at a 0,019 sig.level.
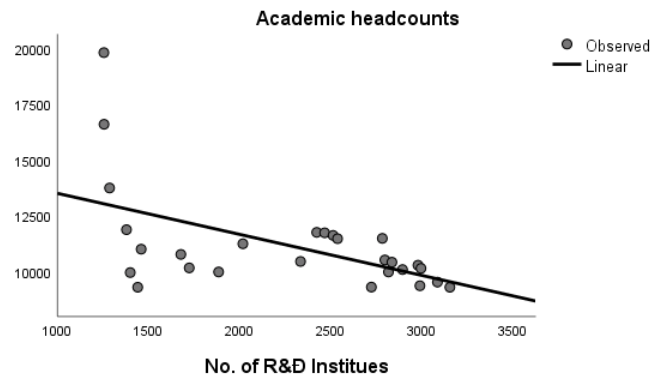
4.1.3   Results for Academis Sectors

Figure 11 Result of Linear Regression for Academic Sector

Source: Own edition, based on Hungarian Statistical Office, Statistical tables on R&D

Academic Sector has a negative correlation with the number of R&D Institutions. The bad performance of the non-profit sector could be explained by the tendency of brain drain towards the private industrial fields.

Hypothesis 1. Null hypothesis H1 is being rejected taken the negative correlation result of Linear Regression for Academis Sector due to brain drain.

Hypothesis 2. There is a strong correlation R&D expenditure as a percent of GDP; Total R&D staff as a percent of total labour force.

By the increasing amount of R&D expenditure, which means more investment in innovation supporting economic growth, it should be followed by the number of researchers to provide strong research background in the country.

According to Figure 12 the total R&Ð staff is well below 1% as of total labour force in Hungary, hardly reaches 0,8%. It could be an explanation of the low percent of 1,38% of R&D expenditure in percent of GDP. The two database values (R&D expenditure as a percent of GDP; Total R&D staff as a percent of total labour force) have shown strong correlation with a calculated coefficient of $r(x,y)=0,857$, which indicates that the variables strongly dependending from each other. The examination of the significance of the linear correlation coefficient is the following to define the Hypothesis to be set for the independency of the variables [7].

$$H0: r(x,y)=0$$

n	DF	α	t_{emp}	t_{crit}
26	24	0,05	4,89	2,064

The empirical result is bigger then then the critical, tcrit< temp so the H0 hypothesis is being rejected, which indicates that stochastical correlation can be

stated by the result of the t-test calculation carried out. It was proved that the variables are not independent and strongly correlating to each other.

Year	R&D units			
	Total R&D staff as a % of total labour force	Of which: Researchers	R&D expenditure as a % of national investment	R&D expenditure as a % of GDP
1990	0,81	0,39	1,27	1,6
1991	0,63	0,31	0,45	1,07
1992	0,57	0,29	0,6	1,05
1993	0,58	0,3	0,56	0,98
1994	0,59	0,32	0,56	0,89
1995	0,54	0,29	0,71	0,71
1996	0,55	0,29	0,4	0,63
1997	0,57	0,31	0,48	0,7
1998	0,56	0,32	0,53	0,66
1999	0,56	0,33	0,52	0,67
2000	0,61	0,37	0,64	0,79
2001	0,59	0,38	0,75	0,91
2002	0,61	0,39	0,74	0,98
2003	0,59	0,38	0,76	0,92
2004	0,59	0,39	0,6	0,86
2005	0,6	0,41	0,72	0,92
2006	0,66	0,45	0,9	0,99
2007	0,66	0,45	0,59	0,96
2008	0,71	0,48	0,62	0,98
2009	0,79	0,54	0,75	1,14
2010	0,84	0,57	0,79	1,15
2011	0,9	0,61	0,86	1,19
2012	0,93	0,62	1,33	1,27
2013	0,98	0,64	1,62	1,39
2014	0,91	0,64	1,15	1,36
2015	0,88	0,6	1	1,38
2016	0,82	0,59	0,96	1,22

Figure 12 Main ratios of R&D (1990–)

Source: own edition, based on the Hungarian Central Statistical Office

Having the linear regression to be proccess in SPSS, the same Pearson correlation coefficient (r=0.857) result can be experienced as of the classic way of calculating the methods without a research and analyser economical software. Examining the strengh of the relationship with the determination coefficient in the Model Summary table, r2=0,734, which means that 73,4% is explained by the regression equation of the total variance. While the Standard Error of the Estimate is predicting the precision of the forecast analyses.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,857[a]	,734	,724	,07417

a. Predictors: (Constant), R&D expenditure as a % of GDP
b. Dependent Variable: Total R&D staff as a % of total labour force

Figure 13 Model Summary for variance R&D expenditure as a % of GDP and Total R&D staff as a % of total labour force

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95,0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	,199	,061		3,285	,003	,074	,325
	R&D expenditure as a % of GDP	,484	,058	,857	8,312	,000	,364	,604

a. Dependent Variable: Total R&D staff as a % of total labour force

Figure 14 R&D expenditure as a % of GDP and Total R&D staff as a % of total labour force

Source: Own edition, based on Hungarian Statistical Office, Statistical tables on R&D

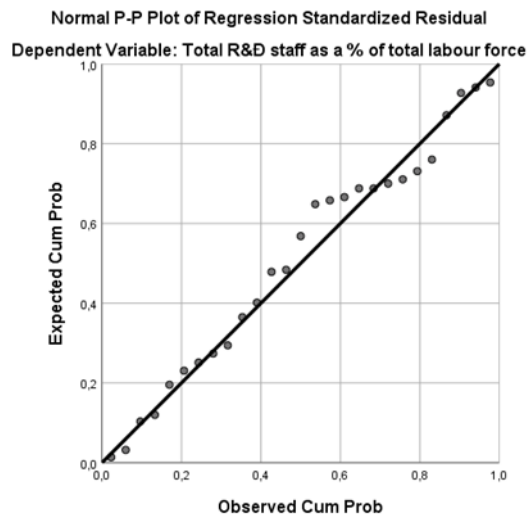Figure 15 P-Plot of Regression Standardised Residual

Source: own edition, based on Hungarian Central Statistical Office

The condition of homoscedasticity is examined by standardized estimated values and the standardized residual. The distribution of the residual is to be normal according to the basic condition of regression. The normality of the distribution is illustrated by graphical histogram in SPSS.
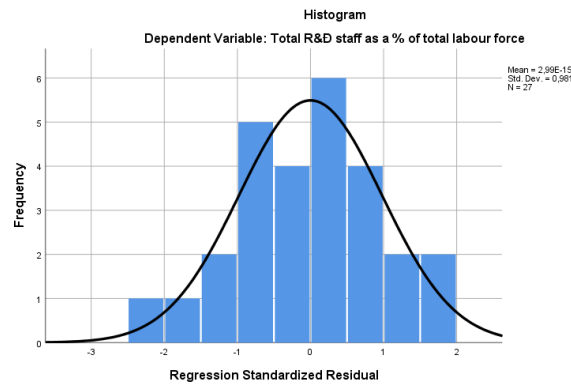
Figure 16 Histogram of Total R&D staff

Source: own edition based on the Hungarian Central Statistical Office

It can be stated that human resource is highly efficient in this scientific market. The main driving force in the laboratory field is high-tech innovation. The most effective tool to enhance competitiveness in the laboratory market is holding scientific seminariums or providing free professional advice to end-users, which explain the needs for well educated professionals. Innovation depends so much on universities' and academics' level of education. Equal access to high education and skills through globalization leading up to race between technology and innovation. Researches executed on high-tech laboratory devices in numerous fields (e.g. environmental protection, food safety, water management, etc.) indirectly support future sustainability.

Hypothesis 2. The statement of H1, alternative hypothesis is acceptable. According to Pearson correlation coefficient: r=0,857, R&D expenditure & R&D staff are strongly depending on each other.

Hypothesis 3. The distribution of R&D expenditure is even among the different sectors.

For the sake of a stable and healthy economic growth, for-profit and non-profit sectors should support and cooperate with eachother for a sustainable future.

Figure 17 indicates that R&Ð expenditure has become four times larger since 2000 in Hungary. According to data collected by the Hungarian Central Statistical Office (herein after: KSH) financial expenditure is mainly represented by private sector through business enterprises as well as foreign sources with a growing amount of EU sources through GINOP and Horizon2020 tenders since 2014. Whereas governmental funding only takes one fourth of the total R&Ð costs, altough it doubled itself in the new century.

Sources of R&D expenditures						
	Sources of R&D expenditure	Of which:				European Union Tenders
		Business enterprises	Governmental	Other local	Foreign	
2000	105388	39790	52207	2189	11202	
2001	140605	48790	75386	3317	12918	
2002	171470	50936	100392	2369	17773	
2003	175773	53926	102008	991	18847	
2004	181525	67351	94049	1334	18791	
2005	207764	81954	102666	974	22171	
2006	237953	103040	106538	1497	26877	
2007	245693	170769	109117	1574	27233	
2008	266388	128683	111401	1600	24704	
2009	299159	138892	125595	2052	32620	9219
2010	310211	146957	122030	2902	38322	9206
2011	336537	159726	128213	3331	45267	11052
2012	363683	170503	134080	3097	56003	14780
2013	420100	196614	150728	3151	69607	19382
2014	441092	212972	147703	3046	77371	15413
2015	468390	232869	162176	3316	70030	17911
2016	427192	241052	112118	3176	70845	12733
Source: own construction based on the Hungarian Central Statistical Office, https://www.ksh.hu/docs/hun/xstadat/xstadat_eves/i_ohk004a.html						

Figure 17

Sources: Own edition, based on Hungarian Statistical Office, Statistical tables on R&D expenditures

It is very common that universities, academic and health labs initiate a growing number of lab devices purchase in the frame of tender sources. According to the research of public procurement tenders, 1,905 were written out for laboratory fields of the total number of 38,450 in year 2016. The number represents roughly 5% of all the total procurements, which is low for sustainable R&D activities.

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		,681
Bartlett's Test of Sphericity	Approx. Chi-Square	114,942
	df	10
	Sig.	,000

Figure 18 KMO and Bartlett's Test

Source: Own edition, based on Hungarian Statistical Office, Statistical tables on R&D

KMO and Bartlett's Test is significant (0,000) and testing whether the Correlation matrix's items are significantly correlating from zero, but it doesn't test each correlation item separately, but in an overall test. It is testing that the Correlatin Matrix is significantly different than an identity matrix.

Kaiser-Meyer-Olkin (KMO) criteria is determining the appropriateness of the interpreted variables specifying for factor analyses. The current result is acceptable as a medium metrics of 0,681. Bartlett's Test is a correlation test, which examines the independency for variables set in H0 hypothesis. In Factor analyses the variables are dependent and correlated to each other, so H0 has to be rejected

with a significant level is smaller than 0,05. So the starting variables are applicable for Factor Analysis. [8]

The Communalities matrix is shown the portion of a variable's variance explained by the total number of factors. Currently the explained portions are extremly high at the business with over 0,9 but also quite high by the governmental sector at almost 0,8 and relatively low at foreign and other sources, non-state sectors, with under 0,5, which means it has hardly any explanatory power.

	Initial	Extraction
Source of business sector	1,000	,982
Governmental source	1,000	,798
Foreign source & Other source	1,000	,479

Extraction Method: Principal Component Analysis.

Figure 19 Communalities

Source: Own edition, based on Hungarian Statistical Office, Statistical tables on R&D

The examination of Communalities shows, how big part of the total factors explained a variable's variance. Starting the examination of Principal Components, the initial values of communalities are 1. After the Factor Analysis the communalities (Extraction) can be found in the third column. The better the results are, the higher the value of communalities than 0,5, but it has to be at least over 0,25. The Communalities table above shows the high amount of results with strong explanatory value.

	Component 1
Source of business sector	,953
Governmental source	,893
Foreign source, Other source	,692

Extraction Method: Principal Component Analysis.
a. 1 components extracted.

Figure 20 Component Matrix

Source: Own edition, based on Hungarian Statistical Office, Statistical tables on R&D

In the Component Matrix component- or factorloadings can be seen, which tell how strong the relationship is between the component and the item. These are Pearson correlation the item with the component. All of these items load very

highly on the component, but the first one, the Source of Business Sector loads the highest (0.953) All items load on a meanful way on the components.

Total Value Explained and Scree Plot, both tables deal with Factor Extraction methods. These two are the most commonly used procedures to decide how many factors should be kept in the solution. Factor Rotated Matrix shows that with only one component to be extracted, the solution cannot be rotated.

According to Kaiser criteria, published first in 1960 Factor Extraction examining Eigenvalue. Only those factors can be taken into consideration, which have Eigenvalue greater than 1. If the Eigenvalue of Factor falls under 1, it contains less information than a variable. Extraction is observed by Scree Plot, illustrating the values of Eigenvalue. Scree plot also help to determine the number of factordimensions. It can be clearly seen that there's only one component is left with Eigenvalue greater than 1. The first component is over 1 with value of 2,4718, explaining the variance by 82,4%. So it means that there is only one component SPSS retained based on the rule. One component explains the relationship among the variables. One component solution accounted for 82,4% of the variance, which is very strong. The total, magnitued of the Eigen value (2.4718) devided by the number of components (3) equal to 0.824 (2.4718/3=0.824).

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2,4718	82,393	82,393	2,4718	82,393	82,393
2	,630	12,596	94,990			
3	,181	3,611	98,601			

Figure 21 Total Variance Explained

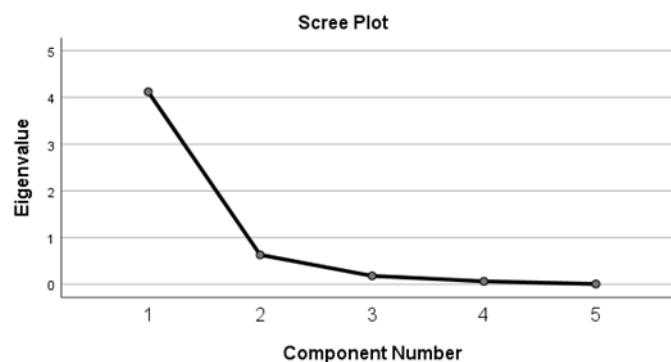Source: Own edition, based on Hungarian Statistical Office, Statistical tables on R&D

Figure 22 Scree Plot

Source: Own edition, based on Hungarian Statistical Office, Statistical tables on R&D

There is a big drop off to be experienced after the first component, and it flat-lines slowly. Both tables show one component solution.

Hypothesis 3. is being rejected. The distribution of R&D expenditure is not even. Business sector loads the highest.

5 Conclusions

The current study is far from beyond the scope of carrying out a full research on a comprehensive overview of the R&D field considering the data availabilty and the time shortness. R&D field in Hungary, but mostly in Europe as well, is a relatively sensitive and narrow segment which can be described mostly with low governmental institution budget. Although the support of R&D through instrument recruitment via proposals has been increasing in the last years.

Previously, there have been no prior attempts in any scientific literatures or publications to examine this scientific research field from this approach. So the current study is trying to fulfill the basic aspects of this 'gap' by providing a deeper understanding, a better line of sight of the actual sectored laboratory research performance as well as identifying the obstacles towards achieving the desired sustainable economic growth target in a long-run R&D activities based on EU funding.

Hungary has been experiencing significant changes in the field of R&D since 1989, date of the regime change. Concerning the intensively growing number of institutes shown in Figure 4, which indicates the increasing role of the private sector, was increased with one order of magnitude since 1990, currently representing almost half of the existing R&D institutes, whereas the number of academic and universities labs remained stable. Despite the fact, some decrease can be experienced during the period of late nineties and early 2000s which can be explained due to the laborcentralization tendency. More expansive cooperation would be recommended to back up R&D activities through the large industrial business sector supporting sustainable economic growth. Total R&D staff shows very low level of 0.8% comparing to total labor force in the country. There is a huge difference between the number of researchers in for-profit and non-profit fields. It can be explained by the brain drain tendency towards the more profitable industrial sectors. Therefore more cooperation would be needed among the academic institutes and universities with production companies operating on industrial sectors. Also a low number of production enterprices is experienced in Hungary comparing to western European countries, which can be one of the explanation of poor economic sustainability. R&D expenditure and researchers' headcount infer strong connection between the two. It is advised to grant more

opportunities for research on wider platform in a supportive environment from the imondustrial field.

Taken the results of statistical methods carried out on different R&D data in the research into consideration, several conclusions can be drawn. Strong correlation was manifested between R&D expenditure and the number of R&D institutions and headcounts, which has a key role in efficient R&D activities increase. However, Academic sector has been constantly decreasing, while Universities have been stagnated with an intensively growing part of Business sector. Looking at the weak performance of governmental sectors, evolving a more effective way of support system is to be considered. While there is no clear assessment of the effect of EU resources, the available sources of R&D expenditure should be optimized effectively among the sectors. Nowadays even non-profit organizations such as universities are pushed more and more to earn their budget due to insufficient governmental and private financial support. Evaluating the current surveyed situation of research development, more cooperation would be needed between industrial sectors and universities to back up efficient R&D activities. Also the growing amount of Open Innovation on the laboratory market supports strong background for upgrowth R&D intensity.

Considering the scope of the study further researches covering full range of data are suggested on this field for more extensive results.

Summarizing, it is easily can be stated that the research development supportive laboratory market has a strong influence on the rational resource management and environment protection and by its developing activities it also supports sustainable development. Just like in every other industrial sector also in the laboratory market the importance of the education of sustainability is rising besides the booming pace of technology development and the increasing ecology consciousness.

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A Game and an Experiment

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Abstract: The authors created an economic experiment, which later was gamified. The aim of the experiment was to measure the causes and motives of tax evasion. The multiplayer decision game identifies factors which can influence tax morale. In order to define these factors, we created the rules of the game based on how citizens make their decisions so we are able to describe and measure the factors bearing influence on their behaviour. How do taxpayers think about paying taxes? In what ways is it significant? The observation of this sensitive topic can be rather challenging. This publication describes the conceptual model that is based on theories built into our game. We defined a new method that measures taxpayers' behaviour in real life situations. Applying tools of gamification, a new experimental game was designed. Further experiments have already been started, whose theoretical background is published in this present study.

Keywords: Taxpayers' behaviour, Gamification, Tax Evasion, Public Game, (Non-) Cooperation

JEL Classification: C72, E62, H26, H30

1 Introduction

Since Richard Thaler received the Nobel Prize in 2017, the popularity of behavioural economics has risen sharply, and both international and Hungarian literature [10][15] has widely reviewed the model of homo economicus, the rational image of man Thaler calls Econ [16]. Such qualities can be attributed to the individual (new image of man) he simply calls Human which can be observed in everyday behaviour or decisions, often through instinctively used heuristics. The interdisciplinary fields of economics and psychology can be observed to be merging in the novel behavioural economics. This decision maker is already

Human, with the feature of a desire to play games, and thus we can introduce a new image of man, i.e. homo ludens (playing man). The playing man (see the summary [13]) has the basic need of sensible, free game – in a space where competition is carried out in a safe, closed environment (not real, but hypothetically seeming real). In this present article, we attempt to create a game to test the homo ludens in situations typical of Humans.

Throughout our work, we designed an experiment to measure willingness to pay taxes, which we later gamified. Our objective is to utilize information gained from the game, and to measure people's real attitude to paying taxes. In short, we created a game to measure willingness to pay taxes. Following the adaptation of information gained from the game, we will have information about what decisions people make when contributing to public goods.

Arthur Laffer supposed that when tax rates are too high, economic operators become inactive [8][17]. Laffer and others concluded that excessive, unjustly high tax rates cause a wide gap between gross and net wages, leading to lower productivity, lower incomes and, consequently, lower budget revenues.

During experiments carried out in Montreal's Lub3-CIRANO Laboratory, Louis Levy-Garboua, David Masclet and Claude Montmarquette [4] were testing the rule known as the Laffer curve. Garboua et al. presumed they had found proof of the existence of the behavioural Laffer curve and that their findings accord with those of Sutter and Weck-Hannemann [14]. Results supported the supposition that in case of endogenous experimental conditions, social norms punish too high tax rates, while they do not punish too low ones. Based on the results of the experiment, the shape of the Laffer curve accounted for both the fair tax rate, as a focal equilibrium point, and the extent of emotional intensities. Tax revenues showed significant differences when tax rates were intentional, and not random. Experiments have shown that with both endogenous and exogenous experimental conditions, employees react dynamically to changes of tax rates (all participants expected a fair taxing behaviour towards social norms). The correlation between the willingness to be employed and the changes of tax rates was independent of whether particular tasks were taxed intentionally or at random. The intensity of the reaction depended on the growth in tax rates and the number of job opportunities defined during the experiment. Based on the results, experimenters found that punishment and tax evasion were of a similar extent to that of the game of public goods, where players can maintain or avoid co-operation with other players, in the case of a low expected income [4]. Persons with higher incomes, however, are significantly more sensitive to changes of tax [7]. During the experiments, this phenomenon was modelled through increasing the available income and the number of tasks that can be performed.

Concerning public goods, Human can mostly be observed in the form of the free-rider behaviour. The theory of the free-rider problem is the most widely applied theorem to describe the relationship between groups and the contribution to public

goods [5][11]. The free-rider problem states that, according to the Nash prediction, what serves citizens best is a non-contribution to public goods [1].

James Andreoni's [1] public-goods game experiment was searching for the answer to whether the free-rider problem is explained by experience gained throughout the game or the rational thinking of the participants. Willingness to contribute to public goods was not explained by either the earning process, or following the best strategy. James Andreoni [1] proved that what the game of public goods teaches people is not to behave as free riders, but that there are free riders in the game too. Related research by Ernst Fehr et al. [3] confirmed that a significant ratio of people are conditional co-operators, i.e. they are willing to co-operate, provided their peers act similarly in a high enough number.

Ernst Fehr and Simon Gächter [3] pointed out that a spontaneous and uncontrolled punishing environment leads to a violent reaction of participants, increasing the number of free riders considerably. If participants could punish deviances such as the free-rider phenomenon, contribution to public goods was rising significantly. The free-rider problem evokes negative feelings in co-operative people, urging them to punish free riders.

The extent of redistribution of investment into public goods shows a positive relationship with willingness to cooperate. During the distribution of public goods, agreeing on a strategy and promises of co-operation will generate actual co-operation only if the promise is made by every group member, and the willingness to co-operate becomes the group's identity [2].

2 TAXIVITY

We wished to create the economic experiment we designed in a way that it is suitable for a proper modelling of taxation, participants can make real decisions, and the factors influencing behaviour can be measured. In short, we wish to know what decisions taxpayers make, what determines contribution to public goods and the willingness to pay taxes.

We further wish to specify the traditional economic theory, the phenomenon revealed by the Laffer curve, the willingness to pay taxes, and tax fraud as a phenomenon through psychological and economic theories regarding human behaviour. When designing our experiment, our starting points were the 2008 experiment carried out in Montreal's Lub3-CIRANO Laboratory by Garboua et al. – proving the existence of the Laffer curve –, and James Andreoni's 1988 public-goods game experiment, respectively.

We found gamification of the experiment necessary due partly to the necessary number of experiments – to have an appreciable amount of data available –, and

partly because we tried to avoid the participants getting bored. When designing the game, we did our best to make sure that the actual players playing the game are the participants themselves, and not the leaders of the experiment. A serious argument for gamification was that after the original experiments, participants were paid in real money, while our players need to settle for the experience of the game and token money.

2.1 The Experiments Taxivity is based on

Garboua and his colleagues [4] applied the REGATE program developed by Zeiliger. Pairs and roles were allocated randomly and were not modified later. Participant (A) was the tax collector, Participant (B) the taxpayer. The experiment was made up of 18 periods, and participants did not know how many times they should repeat the game. In each period, Participant (B) solved different computer tasks in which numbers were to be decoded from a grid of letters appearing on the screen. In the case of an internal, endogenous initiative, Participant (A) chose the tax rate out of four options (12, 8, 50 and 79%), which Participant (B) had to pay Participant (A) for their completed tasks. Participant (B) could decide about how much work they wished to complete. Participant (B) was allowed to modify their decision in each period, while Participant (A) could modify the tax rate only in every third period. The successfully decoded tasks were paid for and they formed the base for taxes. A period ended when Participant (B) finished the tasks they had taken on. In the case of an external, exogenous initiative, the procedure was similar except that Participant (A) could not decide about the tax rate, which, out of the four options, was selected at random by a computer. While Participant (B) was working, Participant (A) was playing computer games or reading a magazine. Participant (B) was aware that it was up to them how much of their income they share with their passive partner, since it was Participant (B)'s choice how much work they took on in each period. Both the endogenous and exogenous experimental conditions were further broken down by restricting the number of tasks Participant (B) could fulfil. In a given experiment type, 26 and 52 tasks could be completed. Throughout the experiments, the income available for Participants (A) and (B) depended on the number of tasks Participant (B) carried out correctly. Participant (A) received tax incomes, Participant (B) received the after-tax net income. In the experiments, every correct task was worth 100 ECU (experimental currency units). At the end of the experiments, participants received real money.

Andreoni et al. [1] carried out experiments with traditional public goods. They repeated the simple public goods game ten times. One group consisted of five members. Every participant received tokens of 50 units, which could be exchanged for money, were they invested into private or public goods. Private investments were worth 1 cent per token, while investments into public goods depended on how much the group members had invested. Every such investment

generated 0.5 cents of private income and 0.5 cents of public goods income for each participant. If all five members invested their tokens into public goods, then every participant gained 2.5 cents of social reimbursement (public good income) and 0.5 cents of private income. After investments into public goods, everybody received incomes to an equal extent, whereas private investments yielded an income exclusively for the investor. During the experiment, participants were not allowed to communicate with each other. At the end of each round, only the total amount of public goods was revealed. Participants could easily calculate what the ratio of contribution to public goods was. To examine whether gaining experience or the dominant strategy of participants (the Nash prediction) was decisive, groups were formed in two ways. Partners remained the same throughout all the 10 experiments, while in the case of strangers, the group members changed randomly during each experiment, every group member could take part in the same experiment with the same group members only once.

At the same time, the questions of justice and punishment play an important role in examining the free-rider problem (the dictator game and the ultimatum game developed by Thaler et al. are also based on them). Kahneman, Knetsch and Thaler (1986) proved with experimental situations that in economic decisions, profit-maximizing players place justness before their individual interests, and what is more, they are willing to sacrifice resources or renounce a part of their income so that the ones being unfair to them or to the market players be punished. In our game, they need not give up resources to have their unfair partners punished, the state will do it for them, but during the game, they will find out if any of their partners were found not to have followed the rules, i.e. who the free riders were (benefitting from public goods without paying taxes). At the same time, the extent of public goods depends on taxes paid, so if everyone happens to be a free rider, the state will have nothing to redistribute.

2.2   Rules of the fair Taxivity

Taxivity is a public goods game in which 1 or 2 game masters and 5 players participate in the experiment. Taxivity is repeated through 10 rounds. Every participant gets an income of 5,000, 10,000 or 15,000 in the form of token money in every round, after which they pay tax. The distribution of incomes may seem random, but at the end of the tenth round, every participant receives the same amount of cumulative nominal pre-tax income, i.e. the amount of ten times 10,000. Each round symbolizes one month, and players pay tax after the income received in that given round (month). The state pays out public goods to citizens in the form of money, as the equivalent of healthcare, pension, education and public services. The state (may) check on players' tax payments. The punishment is double the amount of unpaid tax. It is paid by the player checked, and at this point they also receive overpayments (if they had paid more tax than what was specified). The audit examines tax payments of the previous three months, after

which free riding or overpayment lapse. The audited player is chosen by the players themselves, rolling the dice. In the case of a roll from 1 to 5, the player of the given number is audited. In the case of a roll of 6, players do not get audited. Tokens may be invested in public goods through taxpaying. The invested amount is a contribution calculated on the basis of the tax ratio said by the Examiner. The tax rate may be 20, 40 or 60%. Public goods are 75% of twice the taxes to be paid, distributed between players in an equal manner, regardless of individual players having contributed to public goods or not. If the government treasury does not have enough tokens for public services, public goods are not, or only partially paid out. The government strives to cover its liabilities with credit as well, but its transit time lasts for a full round. Earnings of a given round cannot be reinvested in later rounds. The winner is the player having the most tokens by the end of round 10. But who will collect more money: the free rider or the taxpayer?

2.3 Rule of the unfair Taxivity

The above-mentioned rules apply here, with one exception:

"Public goods are 20% of the base of taxes to be paid, distributed between players in an equal manner, regardless of individual players having contributed to public goods or not." Observably, the amount withdrawn by the state (transaction costs of public goods) is outstandingly high; with such costly state activity the extent of redistributed public goods is quite low, while free riding is still risky with the degree of punishment remaining high.

2.4 Experiments with Taxivity

The experiments are repeated in two ways. In one group players are not allowed to communicate, while in the other group conversation is permitted. Following these rules, four types of experiments can be carried out.

3 Hypotheses

Taxivity, the economic experiment and game model, is based on the following hypotheses, which later can be checked with hypothesis testing:

H1: Willingness to pay taxes is affected to a measurable extent by dependent variables built in the experiment, as follows:

H1A. In the case of higher basic income, experiment subjects pay proportionally less tax. Literature: Kahneman and Tversky [6] weighting function. A loss aversion ratio may even be calculated, but the effects of multicollinearity are also

to be considered, since it is also affected by the extent of tax rate, i.e. there will be a link between H1A and H1B.

H1B. In the case of higher tax rate, experiment subjects pay proportionally less tax. Taxpayers punish tax rates deviating from social or group norms. Literature: Laffer effect, a behavioural Laffer curve effect [4][8][17].

H1C. Punishment diminishes the free-rider phenomenon. There is a tight connection with hypothesis H2A, since among individual features it is risk propensity that determines the degree of taxpayers' conditional co-operation with the state and other citizens. [3].

H1D. In the case of unjust conditions, the ratio of tax evaders is proportionally higher. Experiment subjects' willingness to pay taxes is influenced by the redistribution being just or unjust.

H2: Individual features influence willingness to pay taxes.

H2A. Emergence of crime and tax fraud (taxpayers' rational decision to maximize benefits) is influenced by the expected degree of punishment (among others: Theory of Law Enforcement, Graetz-Reinganum-Wilde, [9]).

H2B. Co-operation increases considerably if experiment subjects are allowed to communicate. A significant ratio of people are conditional co-operators, i.e. are willing to co-operate if a sufficient number of their peers do likewise [1][2][12]. Purity of altruism depends on the behaviour of others.

Under H3, we can examine the role of the state, the general government balance, and the free-rider problem and the effect of the Laffer curve on it.

The hypotheses, which later will be integrated in the research as hypotheses to be tested, are marked with the letter H. For the formulation of the hypotheses, it is indispensable that we clearly identify and define the variables to be measured (with precisely assigned measurement scales) and the above-mentioned correlations between them, and the statistical methods mapping the correlations, respectively. These, however, are not identified within the framework of this article. Here the conceptual model (Appendix 1) makes it easier to overview the serious research question and model behind Taxivity as a game.

4 Discussions and Conclusions

The conceptual model of TAXIVITY models human behaviour in a simplified tax environment where the behavioural Laffer effect and the free-rider phenomenon can be examined simultaneously. With the model, we can examine risk propensity of participants, comparing it to their willingness to pay taxes. To measure risk on an individual level, we apply DOSPER (Domain-specific Risk-attitude Scale), a

measuring device developed by Weber et al. [18]. Risk emerges at several points in the game and in the model – an exposition of this, however, does not fit within the framework of this present article.

The model examines the Laffer effect, with random changes made to the degree of taxes to be paid. It enables the regularity of checks, the degree of punishment, and the examination of correlation between taxpayers' risk propensity and willingness to pay taxes.

Examination of the free-rider problem is secured by all measurable factors of the model. When state redistribution is fair and the increase of taxes imposed and the amounts paid out for public goods increase parallelly, we can examine the free rider effect of Human, while in the case of unfair state redistribution, the behavioural Laffer effect can rather be examined.

All of these independent variables will bear an influence on the extent of taxes paid, so the individual, independent variables can be examined individually, or through their collective multicollinear effect – how they affect the willingness to pay taxes, or its degree. Unlike previously, during our research we talk about the free-rider phenomenon when the willingness to pay taxes is damaged, i.e. in a relative ratio, taxpayers pay less tax than what has been imposed.

Acknowledgement

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Appendix 1.
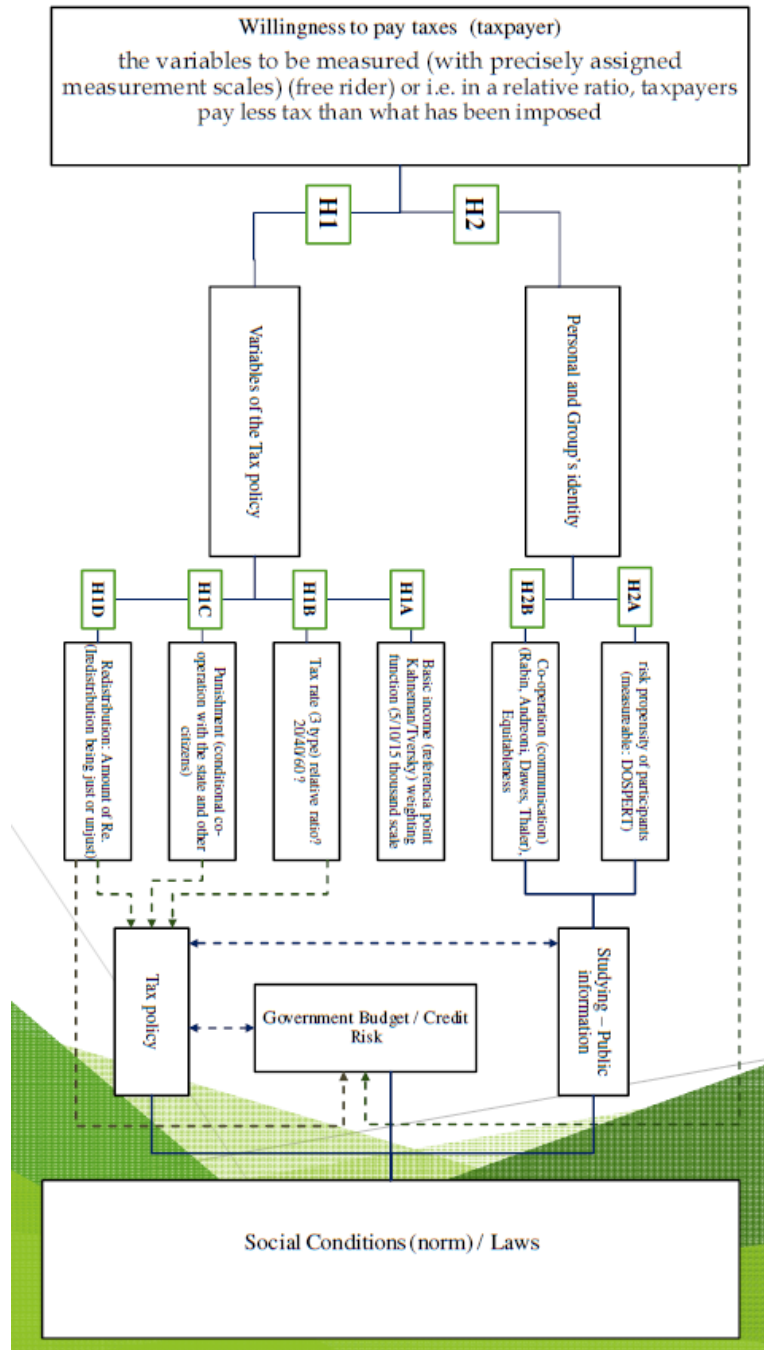
An exploration of sensory marketing in fast-fashion retailing

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Abstract: Human senses, such as sight, hearing, smell, touch and taste, consciously or unconsciously influence emotions. These effects, in conjunction with individual experiences, may have favorable or even negative impacts on customer behavior. The purpose of sensory marketing is to transmit positive and influential messages to the customer via stimulating the receptors of the brain. These effects have been studied in the field of fast fashion, which has significantly transformed the fashion market over the last twenty years and is now playing a decisive role in purchasing. The aim of the research described in this paper was to analyze the relationship of sensory retail marketing strategies to effects on customer behavior. A further target was exploring the connections between sensory marketing and sustainability. A quantitative survey method was used to research and highlight the effects of visual communication, background music, scent, and touch on customer behavior. Results confirmed the hypothesis that minor forms of stimulation such as the right lighting, background music, or an appropriate scent can lead to significant growth in sales, a more positive brand image, and the acquisition of loyal customers. It is suggested that further research into the techniques that can be used in online shopping is conducted as the sense of smell and touch are not available to the related marketers.

Keywords: retail strategy, retail marketing, sensory marketing, fast fashion, apparel store

1 Introduction

The five senses (sight, hearing, scent, touch and taste) influence everyday life through facilitating the interaction between the environment and human beings, resulting in diverse forms of behavior. These senses, in conjunction with

individual experiences and emotions, may favorably or even negatively affect behavior. This impact is discernible in several situations, among others in retailing through its influence on customers.

Sensory effects can determine the length of time customers spend in a store, thereby influencing buyer satisfaction, thus the profitability of the retailer.The purpose of sensory marketing is to send stimulating messages to the brain that have a positive impact on customer behavior. Such impacts are mostly subconscious, so it is not possible to exclude them. Purchasing in the absence of lighting, of smelling the scents and hearing the sounds that surround us, or buying apparel offline without touching it – are almost impossible. Sensory marketing can be applied in both a strategic and in a tactical way because it can support differentiation and foster customer value creation [16]. The present research focuses on apparel retailing, thus it concentrates on sight, hearing, smell and touch as the external cues which enable the retailer to enhance the customer experience. However, it does not deal with taste, which is an important tool of food retailing.

The effects of these four senses have been studied in the field of fast fashion, which has significantly transformed the fashion market over the last twenty years and is now playing a decisive role in purchasing. The concept of fast fashion is to replace the product range as often as every two weeks with affordable goods, thereby boosting rotation speed, product turnover, and the liquidity of the enterprise. There are now many fast fashion stores around the world, including Zara and Stradivarius, which are the part of the Spanish Inditex Group, the Swedish H&M, and the Polish Bershka, and Mohito. The aim of the present research was to analyze the relationship of sensory retail marketing strategies to customer behavior. For this analysis, secondary and empirical methods are used. The functions of the sensory elements in purchasing habits and decisions are analyzed through online questionnaire surveys.

2 Literature review

"Fast fashion" is a term used by fashion retailers and is based on the quick replication and production of the fashion of the catwalk and taking advantage of maximizing logistical and shipping efficiency, resulting in the newest trends arriving in the stores within two weeks [4]. Over the past twenty years, the fashion industry – thanks to fast fashion – has improved significantly and motivated retailers to produce more, faster, and cheaper [2]. In this, consumer decision making that involves sight, hearing, touch and smell play an important role, thus understanding the role of these impacts can create valuable benefits for sellers [18]. In stores, variable factors such as colors, shapes, sizes, music, scents, textures and temperature affect customer behavior and may generate favorable responses [6]. According to Hulten [8], sensory marketing is a service process that

generates consumer value and experience by focusing on instincts and helping create a multiple sensory brand experience that supports individuals' identity through cognitive processes and the five senses. Krishna [9] suggests that sensory marketing is connected with the customer's mind and affects their perceptions, judgement and behavior.

The most dominant and strongest sense used by marketing specialists is vision [3]. The lighting of a store enhances not only the quality of its visual appearance, but is also able to affect customers' emotions, and thereby their behavior [7][14]. It is a fact that colors are also able to influence the functioning of the human brain through stimulating emotional effects which are consciously used in retail to inspire consumers to shop [1]. Use of the right colors can favorably affect brand identity, product differentiation, competitive advantage and loyalty; furthermore, it can increase the volume of sales, shorten the time taken to purchase, lengthen the time spent in stores by customers, and increase the number of return visits [19].

Visual elements can affect the human senses and so can background music, which requires conscious planning [1]. Judicious use of this medium can improve a store's appearance, positively impact employees, and encourage purchasing [12]. In addition, it may spur customers to act or change their mood by subconsciously affecting the brain and emotions (Scott, 1999). The effects of music may include increasing the tolerance of customers (concerning, for example, waiting time), their susceptibility to employee recommendations, and dwell time in stores [1].

When choosing the style of background music, it is important to know the target audience [13] because the style of music can attract different segments. Musical tempo and volume can affect how customers traverse a space, determining time spent in the store, while also building corporate and brand identity. Quiet sounds encourage conversation with shop assistants, while louder ones tend to be more attractive to younger customers [5].

Scent is one of the more effective ways of affecting human emotions because it stimulates the limbic system of the brain which plays a fundamental role in emotion, memory and behavior, thereby potentially influencing the buyer's mood in a subconscious way [11]. Olfactory effects are dependent on personal traits; for example, what motivates a customer to enter the store, and whether they are utilitarian or hedonistic shoppers, which can be differentiated in the following way [11]:

- utilitarian shoppers are motivated by targets and are significantly affected by scents, perhaps because they are more receptive to perceiving them subconsciously;
- hedonistic customers are looking for happiness, pleasure and enjoyment while shopping, but may be scarcely influenced by scents, although other factors such as the variety and design of clothes affect them strongly.

Peck and Wiggins [15] claim that even the possibility of touch can influence customer behavior. Tactile stimuli may foster interactivity because they can trigger movement through direct contact [8]. Traders have also discovered that when customers want to touch products, they may also be willing to buy them: surveys have also shown that allowing customers to touch products can increase sales, while not allowing touching can lead to frustration and non-purchase [10]. In the field of fashion, form and texture (e.g. softness and silkiness) may dominate purchasing decisions in comparison to other experiential characteristics like weight. However, the latter factor may be a factor in some cases of purchasing such as with sportswear and jackets.

3 Research methods and sample

Based on secondary research, the empirical investigation this paper is based on explores the influence of the four sensory marketing strategy elements on customer behavior. The hypotheses, which are based on secondary research, are summarized in Table 1.

Table 1. Research Hypotheses

H1	Customer behavior regarding sensory stimuli are multidimensional.
H2	Customers can be segmented according to which sensory stimuli they are more receptive to.
H3	Hedonistic customers are influenced by assortment variety and design and can be differentiated by their focus on shopping-related pleasure and enjoyment.
H4	Scent-influenced utilitarian customers are a distinct segment of customers.

Source: Authors' own construction

Quantitative research was carried out with the use of online questionnaires. Because of the sampling method and limited sample size, the research was not representative, and findings are thereby limited. Results were analyzed with the use of the SPSS Statistics 20 software package.

The target population of the survey consisted of those individuals who regularly shop in fast fashion apparel stores. From 265 questionnaires, 213 usable surveys were included in the research after filtering out outliers according to a boxplot diagram. The sample is not balanced regarding gender: the share of men is only 10.3%.

The variables referred to in the hypotheses were examined with factor and cluster analysis. Factor analysis as a data reduction technique was applied to reduce the complex dataset of the research by clustering variables into homogeneous groups. After excluding two variables due to inadequate scales, 27 variables remained to measure the four senses related to the atmosphere of the fast fashion store.

4 Results

To reduce and abstract the variables, VARMIAX rotation with Kaiser normalization was applied. The eigenvalue of nine factors is more than one, but the scree spot diagram had a breaking point at the seventh factor, thus seven factors were extracted, although only 58.4% of the content of the variables was explained. The existence of stochastic relations are assumed with the applied scales. As the Kaiser-Meyer-Olkin (KMO) value was 0.709 ($p < 0.05$), the results were considered appropriate and significant for factor analysis (Table 2).

Table 2. KMO and Barlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		**.709**
	Approx. Chi-Square	1850.131
Bartlett's Test of Sphericity	degree of freedom (df)	351
	Significance	.000

Source: Authors' own construction

Factors are clearly defined by their content (Table 3), so characteristic names for each of these were created.

Table 3. Rotated Component Matrix

	Component						
	1	2	3	4	5	6	7
1 Awareness raising due to scent	.829	.279	.078	.038	.014	.075	-.026
Stimulating power of scent	.812	.295	.110	-.016	.077	.108	-.035
Attraction of scent	.811	.191	.039	.101	.098	.148	-.034
Lack of need for scent	-.697	.122	.221	-.117	.191	.100	-.169
Influence of scent on buying	.579	.463	.062	-.095	-.098	.077	-.169
Scent does not have an impact	-.553	.178	.191	-.057	.042	.141	-.067
2 Scent influence on multiple item buying	.201	.663	.258	-.016	.052	-.083	-.266
Attraction of background music	.179	.628	-.273	-.020	.084	.295	.009
Lack of background music influence on multiple item	-.006	.502	-.342	-.248	.037	.290	.088
3 Lack of need for background music	-.041	.066	.819	-.112	-.025	-.140	-.067
Background music impact on sense of time	-.004	.089	.782	.037	-.094	.018	.036
Enjoyment of background music	.064	.359	-.637	-.039	.210	.103	.097
Disturbance of background music	.074	-.113	.530	-.081	.244	.125	.241
Lack of background music impact on buying	-.199	-.366	.406	-.062	.059	.276	-.103
4 Attraction of shop windows	.032	.085	-.054	.787	-.075	.118	.155
Influence of shop windows	.179	-.101	-.011	.744	.139	.088	.181
Lack of influence of shop window on buying	-.025	.005	.041	-.636	-.229	-.125	.134
5 Opportunity to touch items	-.111	.024	-.094	.146	.865	.033	.052
Opportunity to touch items without buying	-.094	.126	-.099	.241	.830	-.100	-.011
Checking material of items before buying	.192	-.058	.057	-.274	.371	.101	.274
Deterrent influence of unpleasant scent	.178	-.203	.190	-.090	.333	.274	-.021
6 Awareness raising due to apparel placement	.030	.041	-.084	.132	-.032	.715	.144
Attractiveness of design	.041	-.010	.007	.211	.047	.707	-.067
7 Preference for brighter stores	.001	.130	.057	.017	.071	-.016	.767
Attraction of colorful supply	.001	-.172	-.065	.093	.007	.016	.575
Attraction of stronger lighting	-.019	.382	.073	.366	-.018	.181	.426

a. Rotation converged in nine iterations.

Source: Authors' own construction

The variable groups can be denominated as follows:

(1) "scent orientation" is the factor group which contains the most information, including variables connected with scent;

(2) "incentive complex senses for customer attraction and buying" shows the influence of scent and sound on customer attraction and buying. However, the role of sound is related only to attraction to the store not to purchasing;

(3) "disturbance of background music" is related to the negative impacts of background music in stores;

(4) "shop window orientation" includes factors which refer to how a shop window attracts customers and influences buying behavior.

(5) "touch stimuli-centered behavior" contains variables related to the opportunity to touch the items in fashion stores;

(6) "product placement orientation" contains factors relating to the importance of in-store apparel placement and design elements for influencing customer perceptions;

(7) "visual influence" includes factors related to the attractiveness of the brightness and colorfulness of a store.

To better define sensory segments, hierarchical cluster analysis was undertaken. Use of Ward's clustering method and the analysis of agglomeration schedule coefficient values led to the formation of four clusters (Table 4).

Table 4. Main characterizing segments (N=211)

Cluster		Number of members	Characteristics of cluster
Olfactory sensitives		68 people (31.92%)	The segment is dominated by scent. However, except for product placement, all other stimuli have an impact. This group is also highly sensitive to disturbance by background music.
Tactile dependents		83 people (38.97%)	Touching determines the buying behavior of this cluster, and product placement is influential.
Receptive to delightful sights		28 people (13.14%)	Brightness and colorfulness have the main influence.
Visually sensitive	Hedonistic buyers	34 people (15.96%)	Visual design and product placement can affect the buying process – this is associated with McDonnells "hedonistic" group.

Source: Authors' own construction

As the results indicate, the buying behavior of customers is influenced by the four senses in fast fashion apparel stores. However, not every buyer is affected by stimuli, and not in the same way.

The former can be differentiated into an olfactory sensitive group, which is affected by scent but which also very sensitive to more effects simultaneously, such as shop window and sound. However, such customers are very sensitive, especially to sound effects, which have a negative effect in the case of inappropriate style.

The store atmosphere should be managed carefully as product placement and design elements influence other factors such as lightning and colorfulness. The visually sensitive segment is identified as the hedonistic group which was identified by McDonnell [11]. One group of respondents is highly engaged by touching, and lacking this opportunity are not attracted to shops.

Table 5 presents the verification of hypotheses.

Table 5. Verification of Research Hypotheses

H1	**Customer behavior regarding sensory reactions may be multidimensional.**	**Not rejected**
H2	**Customers can be segmented according to which sensory stimuli they are more receptive to.**	**Not rejected**
H3	**Hedonistic customers are influenced by assortment variety and design, which can be differentiated to increase pleasure and enjoyment.**	**Not rejected**
H4	**Scent-influenced utilitarian customers are a distinct segment of customers.**	**Rejected**

Source: Authors' own construction

Research limitations involve the construction of the factors which are only suggestive with a Cronbach alpha value of only 0.563. A further consequence is that correlation between the variables is low, which may question the use of factor analysis. Another limitation of the factor analyses is that the results have an explanatory power of slightly less than 60 per cent of the total. Sample size should have been ten times higher than the number of variables involved in the analyses but because of outlier answers the sample size was reduced. For this reason, further research is required to measure the variables properly.

5 Concluding remarks

All four sense-related sensory marketing approaches can affect customers' perception, decision making and behavior. Customers' attention seems to be mostly attracted by tactile elements. Examination of the data concerning tactile factors suggests that almost every respondent likes to touch apparel, regardless of their willingness to buy.

Sound and scent may affect buyers' mood. However, although background music may improve a customers' mood, most respondents state that this is not a major element in their attraction to a store. Scent also does not increase customer purchases, but it creates value in terms of the general enjoyment of the shopping experience.

Survey analysis reveals that scent, visual design and touching can significantly influence customers, thereby enhancing the attractiveness of a store and the enjoyment value of purchasing. Background music plays a less significant role, although it has a remarkable indirect effect, which is perhaps why customers could not evaluate the factor properly. The involvement of observation as a research method could create a more complex picture. It remains a question for further research which sensory marketing strategies may be employed by sellers to influence customers who shop online.

Acknowledgments

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HUNLYWOOD – comparison of EU cinematography focusing on Hungarian and Latvian film industry

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Abstract: Film-making is considered as an art and a whole industry at the same time. A national movie is a cultural relic which can represent a whole nation. Filmmaking is one of the most important art forms, also a tool for entertainment and a great way to educate. Since its inception, European Union has been supporting the film industry. Film industry is a social and economic value what can make national heritage and as a dynamically growing field it is quite important for a nation. The study is screening and mapping of some EU film market and getting acquainted with some factors what can influence the industry for a sustainable growth. The study also compares the Hungarian and Latvian film industry, as well as mapping their biggest challenges. For the film industry, the audience's perception is an indispensable aspect and going in to the cinema is a particularly preferred cultural activity. Therefore, study shows an international focus group research what can be helpful in mapping the challenges, and it is also a basis for creating a questionnaire research.

Keywords: EU film industry, challenges, audience's behaviour

1 Introduction

The aim of this research is among others, to identify tools what can positively affect the attitude of European audiences on domestic films. Furthermore, to collect data about the European film industry, and finally, to create a basis of a subsequent research with the help of results. The research is theory-based and mainly focused on data collection with studying the results of the reports provided by the European Parliament and the International Union of Cinema. In this paper I will introduce the film industry of some of the EU countries what have achieved success through the years. After, I will highlight those countries that have made substantive changes in the field of film industry to create a functioning film production. Processing of data and comparison of countries has already taken place in a previous research - could see in [22] - here I present the main results.

During the processing of secondary data, I would like to explore the tools that play a key role in film production and in the interest of audience in domestic films. I will present the main features of the film industry in Hungary and Latvia and compare the values of the two countries' cinema markets. I chose Latvia, because this country was one of my destinations in 2018. I took part in an international conference (IAW 2018 held on April 23-28), where I had an oportunity to meet the latvian culture and have a closer look on latvian film history. In my paper, after discussing the hungarian and latvian cinema markets, with help of two international focus groups, I try to find out cinema consumption habits, interest in national movies and look up for additional tools to influencing them. Finally, I summarize the results which will provide the basis for a subsequent questionnaire research.

2 Literature review

The creative and cultural industry in 2016 accounted for 5.3% of EU GDP and provided nearly 12 million jobs, of which nearly 641,000 jobs are produced by the film industry. The industry is a major part of the global economy all around the world. The specialty of film industry is to bridge the gap between art, culture, business and technology. In addition, they create jobs that cannot be outsourced, as they require specific cultural and historical skills related to the nation and the traditions. It is very important that they offer more jobs for young people and women than any other industry in EU and also the industry is resistant to the economic crisis. [5] The film industry has not an easy situation because the behavior of consumers (like creativity or innovation) are independent from the generations' classifications, because they are personal traits like optimisms (i.e. born with) or typical general world relevant like urbanism (i.e. globalization problem) or age-relevant (i.e. change with age, education or maturity). However new special consumer layers appear, such as the LOHAS group, who behave differently from average consumer values [19]. The industry is risky, because the success of a film, especially in Europe, is extremely difficult to predict, and the production has to bring significant financial resources already during the preparations of filmmaking. That is why innovation in this industry is extremely important, which can not come without creative work. In most EU countries, therefore, national films are created with state fund. Since national film production does not get for enough resources from state fund alone - such as in America or the eastern region - one of the major challenges of European film production is the financial difficulties [6]. Moreover, the European film industry is struggling to keep pace with the technological innovation and the permanently changing cinematic habits of European audiences. However, there are many initiatives and programs within the European Union what can help for European film production, like the International Union of Cinema (UNIC) what is represented in 36 countries. The purpose of the association is to represent the economic, social and cultural values of cinemas in the member countries and around the world. Their

further mission is to promote the importance of national films in Europe, as well as to keep up-to-date information for the members, so the alliance has been measuring motion picture trends since 2010. Detailed reports have been available on UNIC's website since 2012. According to the UNIC reports, five European Union countries have outstanding film productions in England, France, Germany, Spain and Italy. In 2012, Spain was not the leader of European film production, as the box office was EUR 507 million, the admission accounted for 76.9 million viewers and the market share of domestic films was 14 percent. (International Union of Cinemas, 2014) In 2017, the box office in Spain was estimated at EUR 597 million, the admission was 99.7 million viewers, and the market share of domestic films increased by 3 percent, what is not a thundering change, but it got Spain to a leader position. In Spain after 2012 they set high VAT on movie theatres what set back the cinema admission. To boost the cinema market in Spain, UNIC held the Fiesta del Cine festival twice a year when movie ticket prices were reduced to only EUR 2.90 instead of the average EUR 6. This campaign boosted the audiences' interest and also enabled new viewers to join. France is trying to raise the next generation of cinema consumers with an effective education and training, as nearly 1.5 million students participate in cinematographic education every year. England organizes movie workshops and performances for young people, which brings participants closer to the movie industry by motivating them into cinema going. It is important to mention one of the most powerful film industry in Central Europe, what is Poland. The film industry in Poland is complex and diversified. National cinemas have more opportunities to apply for funding from several institutions, which result in managing with higher budget. The overall statistics about the polish cinema market are freely available, so market participants have access to day-to-day information while in Hungary these data are difficult to find or are incomplete. Because of this, filmmakers and distributors can easily follow the audience's needs in Poland, and thanks to their feedback, they can develop more effective strategies. The transparent and well-organized Polish film market is also reflected in the audience's interest. The enormous curiosity from the audience on national films has been moving their movies at the top of cinema lists in recent years. Due to their strong festivals, Poland can promote films widely not only for the public but also for the profession [8].

In Hungary, film production is provided by the Hungarian National Film Fund from 2011. Since its inception, they had to develop an operational strategy what could make the Hungarian film industry effectively competitive in EU. The primary task was to support the national movies through the acquisition of copyrights. However, the Film Fund was in debt, what cause the former organization mostly due to inadequate use of resources, overspending and huge loans. Therefore, Film Fund had to settle debts. The irresponsibility of the previous system has strongly influenced the attitude of Hungarian audiences to national films as well, which were fairly passive since the 80s. For that reason, the Film Fund is still working upon wining back Hungarian viewers [21]. The distribution of direct grants is now based on scenario-based tendering and above it is deciding the five-membered Film Committee. To improve the film production

in Hungary a 25 percent tax-preference is a great help what can be used by the sponsoring companies to account for their costs. Currently Hungarian film support is provided by three organizations: the Hungarian National Film Fund, which is responsible for supporting all-night films, the indirect State aid for Film Industry, which includes the reimbursement of 25 percent of the production costs, and finally the National Media and Info communications Authority, which assists short movies and televisions-radios [17] However, the Hungarian film support system is not as flexible as the Polish, because the directors can only apply to the Film Fund or the organization they oversee for money. Also, there is no close co-operation between the members of the distribution network as the film distributor usually joins this chain after the movie is created [12]. While for Americans, this institution is an integral part of the entire film production process. It is important because they can develop a coordinated and effective strategy together to reach the success of a film. However, the success of the films is turning upon several factors, such as admission, cinema box-office, movie payback based on revenue, and many other aspects. Although, the exact ratings and admission data of Hungarian films were not documented or only partially since the 80s. After the establishment of the Film Fund, the rules on movie promotion are often changed, and in the last two years (2016 and 2017) there are no aggregate, but quarterly, movie information on the National Media and Communications Authority which are not detailed. Each year (between 2012 and 2017) Film Fund subsidised average of 46 national films (including full-length, short films, documentaries and animations) and only 9 full-length Hungarian films on average, but in 2017 19 national feature films were shown in cinemas [18]. In 2016, the amount of state fund was more than 7.3 billion HUF (approximately EUR 23.6 million) and the average budget of a feature film is HUF 200 thousand / film (approximately EUR 644 thousand). Figure 1 illustrates that Hungarian films do not always return production support costs (each year those films were listed where data was available). However, the purpose of the Film Fund and the film support system is not to maximize income and profit, but to develop and preserve the culture of the Hungarian film industry [3].
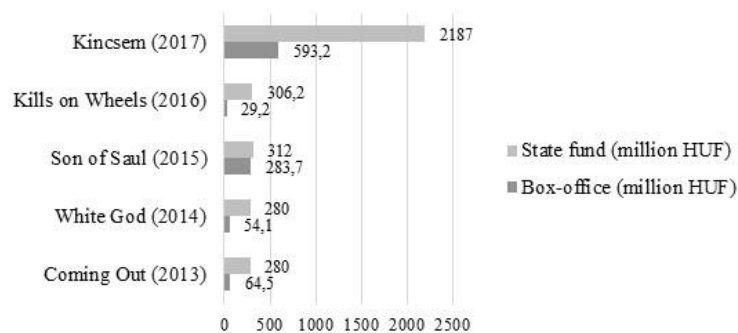

Figure 1 The amounts paid for films funded by the Film Fund and their box-office

In Latvia the funding is handled by the National Film Centre since 2013, what is also responsible for the national policy in the film industry and also in the cinema. International film-projects are handled by the Riga City Council's Riga Film Fund since 2010. Their main roles among others are to promote the competitiveness of Latvian film industry in the European Union, to strengthen the national heritage among the world and also to help for Latvian films to take part in several European support programmes. For the promotion of national films, the Latvian Film Council is supposed to assess and analyse the Latvian audio-visual sector and also to coordinate the film industry's strategy [15]. Before the 90's, Latvian film industry was under soviet occupation, but since its independence, filmmaking became a more powerful value in Latvia. Back at the soviet pressure there was one big benefit for the Latvian film industry, like the Riga Film Studios, what are still one of the biggest buildings in Northern Europe. It was an honour for the Latvian film industry, that in 2014 they hosted the 27th European Film Awards (EFA) what strengthened the corporation between Latvia and the international film partners. In 2017 over 9 million EUR were distributed for the film industry, what was the highest amount since its independence. In celebration of the Latvian centennial (100th birthday of the country), film industry received additional funding and got an opportunity to make more films (sixteen full-length films). In Latvia, Riga Film Fun offer 25% cash rebate of all production costs, like in Hungary, what is also a seductive offer for international co-productions [14]. There many initiatives in Latvia what were focused to strengthen the film industry, like the Latvian Filmmakers Union (main role is to unite the professional filmmakers nation-wide) or the Latvian Film Producers Association (the members of association offer locations and services for productions). [20] The total minimum budget for productions in Latvia is over 700 thousand EUR for animated and feature films, and for documentary films it's over 140 thousand EUR. Latvian state support almost tripled in the last three years (in 2014 the national film support was around 3,5 million EUR while in 2017 was more, than 9,7 million EUR including Latvian Republic 100 Years film support), but the average amount for film fund is 5 million EUR/year. The number of produced domestic films in Latvia increased as well, while in 2013 only 27 national films were produced, in 2017 this number thriven to 45 films including feature and short films, documentaries and animations (the number of documentaries grow from 18 to 29 films), but in 2017 only 6 full-length feature films were produced. In the local cinemas 28 national films (of 45 films) were screened in 2017 what reached over 194 thousand admissions and over 736 thousand EUR box-office at the Latvian cinemas. In Latvia several film festivals have been organizes through the years, like the ten-day long RIGA INTERNATIONAL FILM FESTIVAL, or the RIGA INTERNATIONAL FILM FESTIVAL 2ANNAS what is an independent film festival to introduce for the festival audience some innovative ways of communication in the film industry. In addition, Latvia contributes to support female labour and power within the film industry, like eight of sixteen full-length films for the centenary will be directed by women [16]. However, there are some challenges, what Latvian film industry has to cope with. As it is a tiny Baltic nation they cannot compete with the non-national movies, but this problem is also

appearing in Hungary. The unsatisfying funding cannot finance the co-production movies and the distribution is also fragmented. Furthermore, the cooperation between the TV and studios is delicate and there is lack of professional producers as well. However, shooting in Riga is beneficial because location costs are low and studios successively participating in several co-productions what are setting up their budget as well to make more national films and send it into international film festivals [2].

To compare the Latvian and Hungarian national film distribution and the interest of national cinema audience in domestic films through the years I used the cinema admission, box-office and national film share data (see Figure 2). I present it from 2013, because in Hungary could not be found any exact information about the domestic film distribution data before. In 2014 Latvian film *The lesson* was the most viewed domestic film according to the National Film Centre, but the number of admission and box-office was not mentioned exactly. I also present the TOP domestic films each year.

YEAR	HUNGARY		
	Film title	*Box-office (EUR)*	*Admission*	*National film share*
2017	Kincsem	1 912 435	455 268	9%
2016	The Horsearcher	260 012	59 431	3.5%
2015	Son of Saul	914 814	268 714	4.2%
2014	Whatever Happened to Timi	443 404	104 904	3.7%

YEAR	LATVIA		
	Film title	*Box-office (EUR)*	*Admission*	*National film share*
2017	Grandpa More Dangerous than Computer	281 030	76 068	7.84%
2016	Chronicles of Melanie	241 595	75 160	7%
2015	Brainstorm: In-between Shores	42 000	19 500	4.4%
2014	The lesson	under 172 000	under 38 000	7.58%

Figure 2 National film distribution

As it can be seen, the admission in Hungary grew between 2016 and 2017, what is due to the popularity of national films sponsored by the Film Fund. However, it is noteworthy that in Latvia, despite the difference between the population of the two countries (in Hungary 9 797 561 inhabitants while in Latvia only 1 950 116), the national film share is striking [11]. This can be the result of the strong national film festivals every year as well. After a brief review of the film industry, I switch to the focus group study where I tried to survey the audience's interest in national films in EU and get to know their opinion on an international sample.

3 Methodology

The method I used is qualitative research, especially two international focus groups. The participants of the first group were selected by simple random sampling. The fourteen members of the homogeneous group (six women and eight men) were students in age of 21 to 24, who visited the Obudai University under the ERASMUS program. As the majority of audience in the European film industry (25–30%) took by young people under the age of 25, the participants have been selected accordingly. Hungarian, Slovak, German, French, Portuguese, Spanish and Turkish students were equally appeared. Focus group research lasted 1.5 hours in a personal meeting and was organized in October 2017. The focus group guide asked about filming habits, cinema going frequency, their film selection, and opinions about their national films. The research included projective technique next to open ended questions (9 questions). The focus group was analysed by the transcript, where it was not necessary to use any text mining software due to the clear explanation of the text. In the course of analysing the transcript I used content analysis [23]. The gained information helped me to recognize the elements of audience's interest in their national-produced films and also provided a basis for my subsequent research. During the focus group, I tried to evaluate the attitudes of the participants by describing the affective (how they feel about national films), cognitive (what they know about national films) and conative (how often they go watch national films) components of attitude. The coding categories were formed on the basis of these. Research focuses on the European Union's audience and seeks to find factors that are commonly found in most countries [1]. In the order of the attitude variables, I moved backward during the research and I asked about the affective component of the attitude at the end of the focus group, so that the informal atmosphere between the participants could be evolved. As the study focuses on the Latvian film industry, I have also organized a second, mini group with three Latvian students (3 female students in age 20-21). The guide was followed by the structure and goals of the first one, but I asked them about the challenges of their national film industry more substantial. The research was conducted on an online platform in April 2018 and lasted for 50 minutes. Disadvantage that I could not analyse the non-verbal reactions of the participants, but the answers on the questions about affective variables of attitude still portrayed the emotional components. I will submit the results of two groups separately.

4 Results

At the first national group primarily, I assessed the cinema-going frequency (conative variable). The results showed that the participants are going to the

cinema on average four to five occasions a year, so they are occasional movie-goers (movie going frequency is defined be the MPAA reports) [13]. However, when I was interested about how many times they went to the cinema for a national movie a year, the average answer was never. I've been trying to find out what options they prefer - cinema or any other options - to evaluate what alternatives they use most. Most respondents choose the cinema either way, and only four respondents preferred the home cinema instead of cinema. Two respondents answered that it is depending on the type of the movie or their current mood. However, in case of national films, more participants have preferred online downloading or streaming, as more of them believed that domestic films are not so "spectacular " that is necessary to pay for it. Although ECORYS, a Dutch research firm on the basis of the European Parliament's 2014 report proved that the negative effects of piracy on cinema box-office cannot be detected. However, the report draws attention to the fact that this does not mean that illegal download has no effect on cinema box-office, just the statistical analysis does not prove in due reliability. Illegal downloading is most common in premier films, but for the whole industry it means only five percent decrease on cinema revenue [4]. However, I find it interesting, that for the focus group members in case of domestic films, this option is preferred. When I asked about their all-time favourite films (cognitive component of attitudes), only two Hungarian participants selected a national movie, and in all other cases they did not mention domestic films. When I asked the participants to mention their favourite national films, five respondents (one French, one Spanish, two German and one Hungarian participant) said they did not have any favourite. Other participants chose a comedy for their favourite national film, while in case of non-national films appeared mixed genres (fantasy, thriller or sci-fi). Most of the participants thought that national films cannot create a high-quality visual world, so they would not be able to succeed in other genres, while comedies and their taste of humour are mostly good. With help of projective techniques, I tried to get acquainted with the participants' knowledge not only in national, but also in EU production films. On the basis of pictured scenes from six different EU film participants had to name the movie titles. The movies from 2012 to 2017 were the TOP films across EU cinemas based on UNIC reports (see in Figure 3 from left to right, 1. row: The Great Beauty (Italian), F*ck You Teacher (German), 2. row: Melancholia (Danish), Les Miserables (British), 3. row: Lucy (French), Angry Birds (Finnish co-production)). The most commonly recognized works were the German F*ck You Teacher and the Finnish Angry Birds. The participants said they saw and also liked these movies as they were "*entertaining and funny*". French Lucy was recognized five times and most of the participants watched this movie because the well-known director Luc Beson. Further movies they did not recognize not even once. After, I was interested in their knowledge about the most watched national movies in their country of 2017. Only one Slovakian and one Hungarian participant replied and also knew the name of films what were on the top list.

Figure 3 The film scenes presented to the focus group

After that I was trying to find out why they fond of or have no palate for national films (affective components of attitude). Some of the participants thought that national films are "*special*" and do not get the usual Hollywood story what are "*anti-mainstream*" and they like it more when they're "*funny*" and not "*depressed*". The participants also mentioned that the visual arts of national films are "*artistic and beautiful*", but often they are too "*sombre*". However, visual world is often "*boring*" even though they did not use any special effect. Additionally, almost all participants are considered "*low budget*" as the biggest deficiency of national films. Because of this, the productions can only use limited opportunities, so they cannot attract enough interest. Nevertheless, they presumed that "*beautiful costumes*" and the "*uniqueness of nation's culture*" can assign speciality into domestic films. They also mentioned that these films are producing at nations' own language, so it is no need for subtitles as it making them more "*personal*".

In the second group with Latvian students I followed the same steps as in the previous one. Relative to the cinema-going frequency (conative element of attitude) the participants meet cinema at least once every month, so they are frequent cinema-goers [13]. When the question asked about the frequency of cinema-going in to a national movie, the number of occasion became only once a year or never, and just like in the first group, they prefer to stream or download national movies at home. One of them opt for the cinema, as the best movie watching option, and two of them thought it depends on their mood. When I asked about their all-time favourite movies none of them mentioned national movies, but

they also picked their favourite national movies as well all of them are dramas (*Rudolf's Gold, A Limousine the Colour of Midsummer's Eve* and *The Child of Man*) but also, they mentioned, that there are lots of humour in these films, what make them really good. When I showed them scenes from the six EU movies they named only two movies (*F*ck You Teacher, Angry Birds*) the same as in the first focus group. Furthermore, they did not really know about top listed national movies in 2017, but they noticed some well-known domestic films like *Swingers* or *Chronicles of Melanie.* After, I asked what they are thinking and how they are feeling about national movies (affective component of attitude). They thought that good national movies can make them feel "*patriotically*" and because national movies are made in their homeland it is representing the beauty of the country. They also mentioned, that domestic films are "*building a culture*" and "*making a cultural heritage for the next generations*". One of them considered national movies as a tool, "*what develop the audiences' thinking*" and also they bring domestic audience "*much closer to the roots*". However, they thought that national movies, because they are made in their native language are rarely translated and shown up in other countries. In addition, low budget is also a big challenge for domestic productions and therefore their possibilities are limited not only in their homeland, but also worldwide. One participants mentioned, that most of Latvian films are "*old-fashioned*", because they "*can't lean out of reality*". She thought that "*movies are based on other people experiences*" and "*the tendency is to show the way of life*". Other participant despite of this said: "*I really enjoy that film makers show our nature – lakes, forests, sea and lands. Old films have more humour, but at the same time they show real life of citizen*". They also noticed the 100th anniversary of Latvia what are they proud of, and because of this many new Latvian films would be released. Therefore, they suggest, that in Latvian film industry "*maybe we should start to think more about quality, not quantity of films*". After analysing the transcript in detail, I formulated the coding categories using components of attitude and results of focus groups. I enhanced those variables, what appeared in most answers. Categories are mentioned in the following table:

Table 1 Coding categories made by the attitude of domestic audiences'

ATTITUDE OF DOMESTIC AUDIENCES'			
Affective components		Cognitive components	Conative components
AUDIENCE LIKE IT MORE if the films are:	funny and have humour	AUDIENCE KNOW ABOUT FILMS	GO TO CINEMA OR DOWNLOAD AT HOME
	anti-mainstream		
	the visual is artistic and beautiful		
	show the uniqueness of nation's culture		
	making a cultural heritage for the next generations		
	patriotic		
AUDIENCE LIKE IT LESS if the films are:	depressed	AUDIENCE DOES NOT KNOW ABOUT FILMS	NOT GOING TO CINEMA OR DOWNLOAD AT HOME
	sombre		
	boring		
	low budget		
	old-fashioned		
	can't lean out of reality		

On the basis of results, I take it that every component is linking to each other. The main goal of assumption was to frame a further research (quantitative questionnaire). The questionnaires' purpose is to find effective factors what can influence national audiences to go to the cinema on a domestic movie. It will include the challenges of national film industry what affect the audience by virtue of secondary research, which was inter alia low financing and not flexible support system, bare film festivals, cooperation inside the distribution chain, get over linguistic barriers or transparency within the industry. Devised with the components of attitude (Table 1) the questionnaire will contain the mentioned factors to assess the audiences' need and behaviour.

Conclusions

After a detailed mapping of the EU film industry focusing on Hungarian and Latvian industry I gained factors what are the weaknesses and challenges of national productions in EU. Based on the focus group results I revealed the components of audiences' attitude on national movies. I tried to find common factors, what can describe the most EU film industry. Unconventionally cannot get reliable results by generalization, but the research's main purpose was not to be representative rather to widen the focus. Data about the Hungarian film industry and the behaviour of Hungarian audience towards national films are deficient or difficult to get at, but mapping other nations help to reveal factors which are unreachable otherwise. For instance, it turned out, that for audience humour is an important factor, and Latvian film festivals could be also good example for Hungary to captivate domestic audience. The assessments of Hungarian audiences' behaviour already happened – see [22] – but with help of recent research I can add more specific factors to get precise results. Aim of population in the questionnaire will be the Hungarian residents and the sample would be

chosen by simple random or snowball sampling. Demographic limitation wouldn't be necessary, because I want to categorize the participants based on their attitude not by their demographic variables. As a committed devotee of national movies, I would like to encourage audiences to watch domestic movies, because they are a part of our culture and also a tool what can prompt a nation for cooperation.

Acknowledgement

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Surveying IT threats for server of small business in real-environment with honeypot

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Abstract: The cybercrimes are more and more popular nowadays and not just against the corporations, and the small businesses are vulnerable against the attack too. Most of the small businesses use IT tools, as they have websites, servers, and other information communication-related devices, limited by the smaller budget, they cannot buy the newest, most secure devices since they cannot spend a high amount of money as a typical corporation can. The small companies have less vulnerable data and less prestige to lose, but they are still the target of the attackers. Our article is surveying the external IT security attacks against a small business in the countryside with a honeypot solution.

Keywords: webserver, SSH, Telnet, honeypot, threat, small business

1   Introduction

Day by day, IT is becoming increasingly important to our society as it is getting digitized in every aspect of our lives. More and more electronic information is accessible, just like online activities. Companies that handle them have more data to protect. Everything is managed electronically in the most advanced countries of the world, through payment transactions and health data management, and therefore more data is created, rendering it a greater attack space. Previously, looking at the history of a device, it was possible to determine a present bug, but in the case of explosively growing giant networks, we have no chance of checking them and finding connections between them with the right automated methods and tools. They need to be protected and regulated for the unmanageable amount of data to be handled and analyzed, which can be the so-called Security Incident and Event Management (SIEM) system. SIEM tools work as a collection and

finetuning device between the vast array of protection devices, routers, operating systems, and other sources of information. For example, firewalls, IPSs, antispyware, DHCP servers, and proxy servers send information about each communication and login that SIEM manages and correlates, and decides on its rule base whether it is an attack or not. If it is, after the monitoring of the monitoring team, and the appropriate indications, based on the information gathered, the Triage team can start exploring and eliminating the problem by the so-called response team. Most of the small businesses use IT tools, as they have websites, servers, and other information communication-related devices, limited by the smaller budget, they cannot buy the newest, most secure devices since they cannot spend a huge amount of money as a typical corporation can. The small companies have less vulnerable data and less prestige to lose, but they are still the target of the attackers. Our article is researching the risks of the external attackers with the help of the IT tools. [1-5]

2 Background

Users have a key role in maintaining information security as they are the ones who actually have daily access to data and IT systems. They produce, transmit, and store all of the data on a variety of electronic devices, and if necessary, delete it. As a result, everyone is qualified as a user, manager, operator, expert or outsider who has access to the organization's data. The same thing can be said in the home environment. Every family member, friend, relative, or acquaintance who has access to home computer systems is considered a user. Most importantly, users are aware of threats, rules, and the processes they need to take in order to prevent information security incidents, or if they cannot prevent them, recognize them in time and know what channel they are can be reported to the wages. End-users represent a tremendous value for the incident management team or organization in the incident management process. However, they have an enormous responsibility. A suspicious attachment to the email mailbox, a suspicious phone call, an abandoned USB flash drive in the office on the corridor, or a suspicious wandering unknown in the office. It is vital for the organization to have the ability of users to detect the threats in a timely manner and assess the real risk and report it to the incident management organization. [1-3]

For information systems, the most important thing is to secure data security. There are three data security requirements:

- Confidentiality: something that only rightful people can recognize is limited to those who are eligible for recognition.

- Integrity: something that matches its original condition and is complete.

- Availability: the necessary infrastructure and data are available to you and whenever you need it

The botnet may include computers in a home, school, or corporate networks. Computers are infected by a pest program and then receive commands from central control computers (Command & Control servers) and use them to perform different tasks. They can perform counting tasks, send unwanted emails, steal personal information from infected machines, or even initiate attacks on service denials (DDoS). A large botnet network can consist of tens of thousands of computers. Computers can be infected with malware by using a comprehensive endpoint protection software package, anti-virus software, firewall software, antimalware software and periodically updating software installed on your computer, which can usually be automated with proper settings.[2-3]

Honeypots have quickly become an accepted tool for security arsenals and have gained more and more space in the corporate sphere as high precision, early warning systems. Since honeypots do not have any practical benefits (i.e. no sharp service is run on them), all of their activity can be viewed as an attack and we can take the necessary steps to parry the expected attacks and we can recognize the fact of the attack. Honeypots usually have one or more network connections and some weak operating system and service emulation. Since the only purpose of a honeypot is to detect the attack early, the system has been secure enough to the attacker cannot actually cause damage. System-simulated "server" or a complete computer network emulates minimal functions, such as listening to ports, providing minimal text banners, or making simpler login screens. Commonly known services include Auth, Finger, FTP, HTTP, IMAP, POP, SMTP, SSH (Secure Shell), Telnet, Server Message Block (SMB), UDP (User Datagram Protocol) and RPC services. The attacker detects the honeypot, which looks like a lightweight prey, and while he is analyzing the system, he may leave unwanted traces which could be used to reveal the attacker's identity. [4-6]

3 Measurement

We used the Splunk Light application to handle the high amount of records from our source device. To Analyze the results we used the IBM X-Force Exchange is a cloud-based threat intelligence platform that allows you to consume, share and act on threat intelligence. It enables you to rapidly research the latest global security threats, aggregate actionable information, consult with experts and collaborate with peers. IBM X-Force Exchange, supported by human- and machine-generated intelligence, leverages the scale of IBM X-Force to help users stay ahead of emerging threats. [7-9]
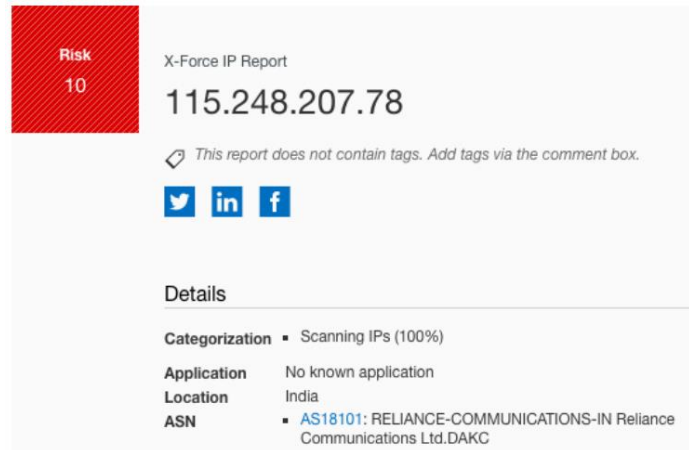
1. figure IBM X-Force Exchange IP report

To analyze the high amount of data we used the X-Force Exchange (XFE) API which provides programmatic access to X-Force Exchange. Each call in the API supports a capability in the UI of the X-Force Exchange platform. The API follows guidelines for RESTful APIs, with the HTTP path defining the service to the call and the resource being requested. [8, 10]

We had connections from 2082 different IPs, based on the results most of the attackers' IPs were unknown in the third-party threat intelligence databases. Only just a few amounts of them can create alerts based on these sources with the right SIEM system.
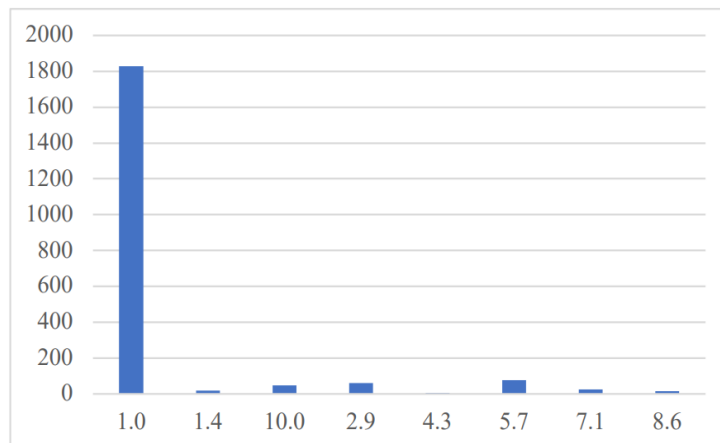
2. figure Risk scores of the IPs

The category of the IP gives us more information about the previously reported suspicious or malicious activity from the source IP. We implemented only the

most specific finding with the highest percentage. We found the much scanned IP related outcome, for example, the shodan.com is a popular scanner site, but other non-publics are in the findings, too. Some of the infected devices work as a Botnet Command and Communication server, or does Spamming or Scanning activity for the commander of the invention. Other IPs have relation or chance to connect, and Botnet related the IPs which confirms our hypothesis, that there exists a significant risk against the servers and publicly available devices.[11]
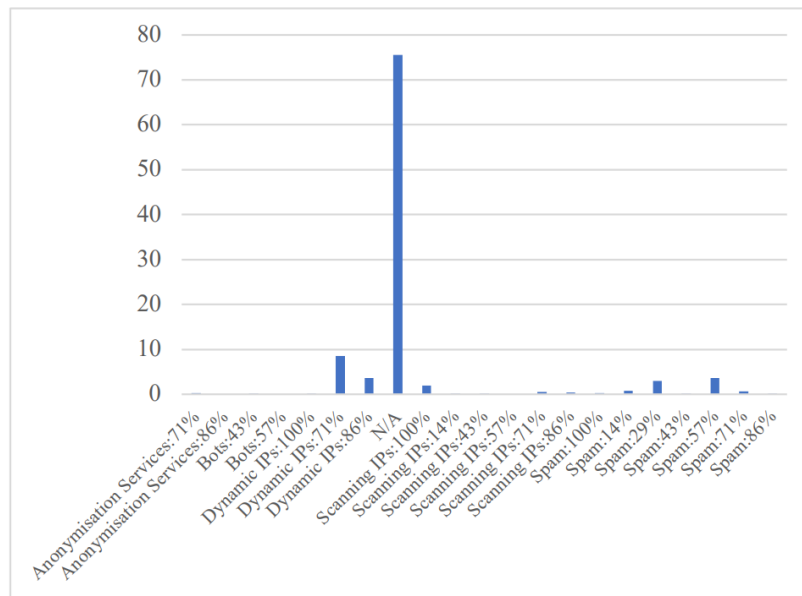

3. figure Categories of the IPs

The following table shows the category of the IPs, related to the risk scores. Based on the findings we can do some more in-depth investigation on our environment by checking the status of our server. We can see our device connected to Botnet related IPs, but because of the risk score, some of them they could be false positive findings. The IPs with the risk score 10, can contain higher risk against our system, although only about scanning and spam related IPs. [11]

	1.0	1.4	10.0	2.9	4.3	5.7	7.1	8.6	Total
Anonymisation Services:71%	0	0	0	0	0	0	4	0	4
Anonymisation Services:86%	0	0	0	0	0	0	0	1	1
Bots:43%	0	0	0	0	2	0	0	0	2
Bots:57%	0	0	0	0	0	1	0	0	1
Dynamic IPs:100%	3	0	0	0	0	0	0	0	3
Dynamic IPs:71%	177	0	0	0	0	0	0	0	177
Dynamic IPs:86%	75	0	0	0	0	0	0	0	75
N/A	1574	0	0	0	0	0	0	0	1574
Scanning IPs:100%	0	0	42	0	0	0	0	0	42
Scanning IPs:14%	0	3	0	0	0	0	0	0	3
Scanning IPs:43%	0	0	0	0	2	0	0	0	2
Scanning IPs:57%	0	0	0	0	0	1	0	0	1
Scanning IPs:71%	0	0	0	0	0	0	9	1	10
Scanning IPs:86%	0	0	0	0	0	0	0	9	9
Spam:100%	0	0	7	0	0	0	0	0	7
Spam:14%	0	17	0	0	0	0	0	0	17
Spam:29%	0	0	0	62	0	0	0	0	62
Spam:43%	0	0	0	0	3	0	0	0	3
Spam:57%	0	0	0	0	0	74	0	0	74
Spam:71%	0	0	0	0	0	0	12	0	12
Spam:86%	0	0	0	0	0	0	0	3	3
Total	1829	20	49	62	7	76	25	14	2082

1. table Crosstabs of categories and risk scores

The X-Force results are based on the vendor, threat intelligence and end-user findings. In case of a miscategorization, we have the ability to report the problem to the site, and the team will check the report and update the database.

In this period, we had several attempts of harming our system, but all of them were unsuccessful. After a more in-depth look at the activities, the attackers tried to download the following 11 files, only 3 of them are well-known patterns by the antivirus or intrusion prevention/detection systems. Most of the malware agents tried to download more specific malware or hacking tools to the attached devices, as some of the files were Trojans and some other bash scripts.
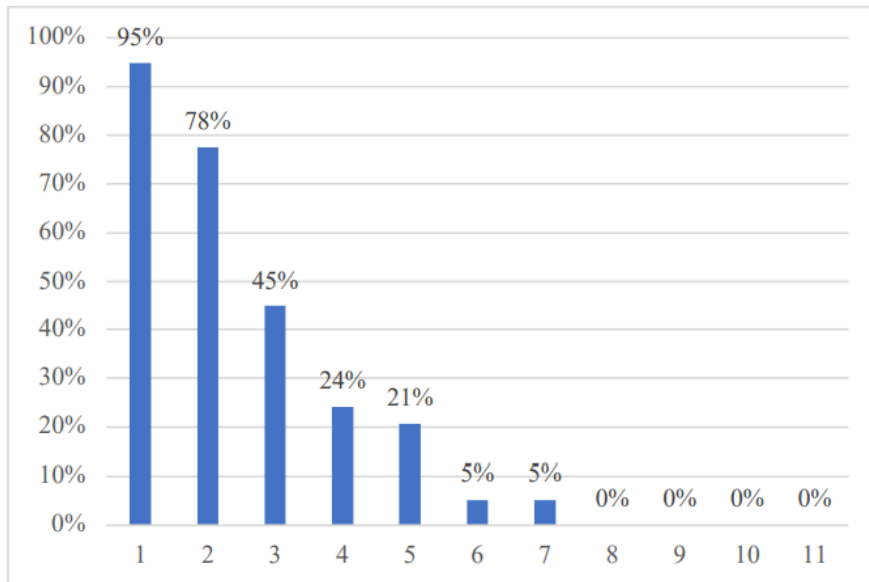
4. figure IPS/IDS coverage

After a Cuckoo Malware Analyze with sandbox test, we know that 9 from the 11 malicious files can create real damage on the system, and we see most of them are not available in the specific pattern databank.

4 Conclusion

Based on the measurements we can confirm the importance of a well-configured firewall accompanied by other security tools. Most of the attacks came from unknown sources or sources with dynamic IP, therefore, it would be impossible banning them from the system in order to mitigate the risk of the external attacks. Every intrusion started with a scan. We recommend improving the security of the servers through the IPS/IDS device installation, password policy updating, privileges and accounts managing, backup rescue strategy creating or overviewing, redundancy providing for central servers/data storage. To prevent the attacks, it is very important to ensure the security-related design, and the regular patches and updates of devices, as well as, periodic full overview of the system to discover the occurred hazards. Some of the caught malware files are not available in majority of the antivirus databases, hence they are not able to provide total defense. By using applying the aforementioned steps, we will ensure that our system becomes more secure. That way, hopefully, we will make the hackers' efforts fruitless.

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