CER Comparative European Research 2021

Proceedings | Research Track

of the 15th Biannual
CER Comparative European Research
Conference

International Scientific Conference for Ph.D. students of EU countries

March 29-31, 2021 | London

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Introduction

The conference Proceedings you are holding is a collection of selected peer-reviewed texts presented at the international scientific conference Comparative European Research - CER 2021 (March 29-31).

The biannual international scientific conference is organized under the auspices of the SCIEMCEE scientific platform every March and October and follows up on activities aimed at providing greater support for the scientific activities of Ph.D. students and beginning researchers. The various biannual CER conferences represent a space for the international assessment of the qualitative standard of scientists and the results achieved by the various academic institutes. The CER conference is an ideal place for comparing the standard of scientific work, particularly on a European scale.

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The conference committee, comprising experts from several university departments, believes that the CER international scientific conference will attract an ever wider base of participants to join in the discussions and will stimulate further scientific work and interdisciplinary development.

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USE OF MANAGEMENT THEORIES FOR SMART CITY IN PRACTICE

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Abstract: *Managerial theories significantly influence modern aspects of smart city management. The aim of the article is to identify common and different elements of models and strategies in the field of implementation of management theories in Smart City practice based on cases of best practice. The article used methods of secondary analysis of case studies, which were selected on the basis of ranking criteria in world indices, according to time, professional relevance and expression of effect in the form of management and decision support. In addition, the method of comparison and summarization was used in the discussion section. The main finding of the article is the focus of global best practices on the elements of increasing the quality of life, sustainability and support for management and decision-making. No selected Smart City city has yet implemented in practice the trend of a centrist-oriented model focused on people, which represents a trend in the area between 2030 and 2050. By focusing on this trend, cities can gain a competitive advantage, improve their reputation and strengthen their position in the world Smart Cities indexes.*

Keywords: *Smart City, managerial theories, strategy, practice, reputation*

1. Introduction

The development of management approaches and methods with a trend of continuing orientation to Smart City points to the need to deepen knowledge of management theory, especially in terms of time, hierarchical position, size of Smart City, deployment, tools, methods and IS(Information Systems) / ICT(Information and Communication Technologies), which can significantly streamline management and decision-making. public self-government and private sector processes.

The use of the theoretical framework in practice is realized on the basis of a case study of the world's best practice. The city management creates a strategy, but its formulation alone is not enough. The strategy must also be implemented in practice in a way that serves as a model for others.

2. Methodology

Examples of "best practice" in the implementation of management theories in Smart City practice were selected on the basis of four criteria.

Ranking in the Smart cities ranking according to world indices - the limitation is in the form of time relevance, i.e. the results of the rankings should not be older than 2018 inclusive, the data can be found in Table 1.

Table 1 Ranking Smart Cities according to world indices

Ranking	*Index*			
	Smart City Index 2019	IESE 2019	ARCADIS 2018	Global Power 2019
1	Singapore	London	London	London
2	Zurich	New York	Stockholm	New York
3	Oslo	Amsterdam	Edinburgh	Tokyo

Source: own processing according to [6, 3, 5, 7]

Temporal relevance - case studies should not be older than 2015, due to the dynamic development of the researched issue over time.

Professional relevance - resources should be based primarily on the strategies of selected Smart Cities. Effect - expressed benefit in the form of management and decision support.

For the processing of case studies, four best practices Smart Cities, i.e. London, Singapore, New York and Stockholm.

3. Results

3.1 London

The first impetus for Smart City London was 2012, when the Olympic Games were held in the UK capital [1]. Professor Davin Gann CBE, Vice President of the Smart London Council, believes that "London must be a place for citizens to live, work and have fun, it requires good management, talent development, support and future anticipation of changes in the demographic curve, growth populations and sustainability trends, "[12]. According to Boris Johnson's vision, "the heart of Smart City London is its people and the private sector," [12].

Mayo claims that management in London should develop on three levels on the basis of the so-called "City management platform" as follows [8]:

- Level 1 - the city council should know the current situation through analyzes, know the current challenges of the city / region, record best practices, cooperate and involve stakeholders, the vision must take into account several possible scenarios of implementation, all this can be implemented via the Internet in online communication, which saves time and costs.

- Level 2 - plans are implemented for each area separately, including key aspects, actors and the transformation process (input → process → output).
- Level 3 - managers should be able to present and implement a development plan for specific areas together with the set goals, explain the strategy to citizens and focus on leadership through integrated management and support for digitization.

The "Talk London" platform has been set up for better communication between strategic management and citizens. Indicators of success are [12]:

- an increased number of Londoners using digital technologies,
- at least 1,000 people take part in the online discussion every month, with an overall goal of 33,000.

Invaluable data are collected from the discussions, which are stored and processed through the city's own platform "London Datastore". The role of management is to reveal which data are a priority for the development of the city, to assign importance to them and to use them for effective management and decision-making [12]. The main goal is to promote long-term sustainability through a 2050 development plan. To build Smart City London benefits everyone without distinction. The programs and strategies are also supported by Queen Elizabeth II, who provided an area for projects in Olympic Park. Environmentally oriented sustainability projects are also supported by Prince William, who wants to implement 50 innovative projects by 2030. The streets are covered by a Wi-Fi network, satisfaction surveys are carried out regularly and people communicate via the platform with the current mayor Sadiq Khan. The key indicators of success are the so-called Mayor's Vision 2020 [12, 10].

In addition to the Talk London and DataStore platforms, there is a project to promote digital literacy in schools called "London Schools Excellence Funging", which involves 450 schools and 1,500 teachers. Participation is built by raising awareness of Smart City's approaches to public debates, forums and conferences, along with the teaching process. The "Tech City Stars" project aims to generate new jobs for young people aged 16 to 24. The collaboration is being carried out by the London´s Old Street cluster in Hackney, Islington and Tower Hamlets. The negative aspect of unemployment in the 16-24 segment (approx. 25% of the active population) is also addressed by the "Team London" program, where young people try out working with technologies, volunteering and the level of lifelong learning [12].

London cooperates with cities such as Barcelona, Bologna and Genoa in data management. The "EU iCity" project has invested € 5.2 million in the visualization of infrastructure and underground metro stations. The innovations are funded by the “Future Cities Catapult”, which is also London's innovation hub. "The Love Clean London" forms a bridge between citizens and the city council. If a Londoner walks through a dirty area, walks past a graphite wall, sees something he doesn't like about his city, all he has to do is take a picture and send it to the city's website. Management collects contributions, prioritizes them, sets the horizon for solutions and eliminates the problem [12].

3.2. Singapore

The initial phase of the development of smart city approaches based on the use of ICT was introduced in Singapore as early as 1980. The development of Smart City in this geographical area has been very dynamic since 2015. Strategic management predictions stipulate that by 2025 Singapore will be the first of "smart agglomerations countries and countries around the world "[11].

One of the main goals of development was to ensure sustainability through an action plan with the idea: "If our country has a clean and beautiful environment, it means that Singapore is well managed."

The landscape ecosystem and development program is based on four layers [11]:

- Connect - smart devices to the network, perceive data as a service.
- Collect - data from the external environment, which serve as a basis for creating information.
- Understand - after assigning content to data, information is created that arrange citizens' awareness.
- Create - generating value and starting cooperation between stakeholders.

The collection and understanding phase forms the basis of the operating system of the model. The transformation framework defines four critical factors for the success of implementing a design in practice [11]:

- Tactics - strategic management of the city adapts to dynamically changing conditions in the region / city. In addition to the main functions of planning, organizing, securing, leading and controlling, emphasis is also placed on forecasting, change management, sustainable development and economic growth.
- Adaptation - Singapore is ready to adapt to the latest technologies, as it has a variable IT infrastructure since the 20th century.
- Talent management - people are an important factor in accepting a significant change in Smart City's approaches. The development of human capital, motivation, stimulation, values, opinions, attitudes and culture form the basis of talent management of selected segments of the population.
- Cooperation - participation, active participation and satisfying the requirements of all actors will ensure the support of innovation, the conclusion of contracts and the implementation of Smart projects, including support for management and decision-making.

Singapore seeks to stay at the forefront of the Smart Cities Index based on the three basic points of the triangle - integrity, internationalization and innovation.

All three parties must be harmonized, otherwise the arrangement will collapse. Singapore is the best practice for creating Smart Cities in China in Asia (Tokyo, Hong Kong) and globally, for cities like New York and London [11].

3.3. New York

The quality of management depends on the set mission, strategy, development plan and set goals (central planning). The Smart City New York model contains four planes, i.e. access to technology as a basic base, support for business and competitiveness, participation and leadership of the government, motivation of the population [2].

The New Yorkers decide for themselves what direction they want to achieve for their city. Management invites them to explain their opinions, discussions and solutions through community meetings. The education and access of young people is striking in the area of management and decision support [2].

According to the mayor, "young people feel interested in the city's problems, by expressing their views, working on personalities and expressions, they become leaders of the democracy that is strongest in the last ten years," [4]. Harvard PhD students appeal to the Smart City approach planning process. In their view, it is irrelevant whether "data is collected through open access platforms and portals or the city's technological strategies, but must always be based on a managerial planning function," [15]. The New York Plan of 2007 includes three basic characteristics - quality of life, commitment and reduction of consumption of limited resources (principle of sustainability) through indicators and quantitative indicators [15].

3.4. Stockholm

The city management has adopted a strategic approach that is oriented to the needs of citizens. The development was realized through the implementation of digital approaches in the society. The basic idea of the concept for Smart City Stockholm is that "all investments should reflect the interests, needs and requirements of its current and future inhabitants," [13].

Communication with stakeholders takes place through the use of social networks and the city's website. Citizens' satisfaction surveys are carried out on a regular basis. Every month, the city council organizes discussions about Smart City with all age groups. Thus, up to 3,350 people will provide feedback in a short period of time, generating management and decision support [13].
The primary goal of strategic development is to increase the quality of life of citizens and support the competitiveness of entrepreneurs in the current spheres of business. The basic elements for the creation of Smart Stockholm are openness, innovation and connectivity. The city seeks to build sustainability, especially in areas such as finance, society and ecology [14]. For the successful implementation of the 2013 strategy in practice, it is necessary to ensure the achievement of eight strategic principles [14]:

- Needs - initiatives reflect the needs of interest groups (government, citizens, universities, entrepreneurs, etc.).
- Prioritization - ranking is determined by set goals, frameworks and strategies.
- Support - depends on internal and external cooperation with partner units.
- Frameworks - used to describe perspectives in the long term, i.e. 5 and more years.
- Data collection - is carried out through surveys, research, surveys and discussions, data are later analyzed and processed into information to support management and decision-making at the strategic level of the city.
- Approach - new concepts and digitization processes will become a natural part of the city's planning and implementation processes.
- Change - guiding citizens through communication, participation and motivation in internal and external way.

4. Discussion

The secondary analysis of the case studies revealed the following common and different elements, which are summarized in Table 2.

Table 2 Common and different elements of case studies

Prvky	*Smart City*			
	London	Singapore	New York	Stockholm
Quality of life	Yes	Yes	Yes	Yes
Sustainibility	Yes	Yes	Yes	Yes
Management and decision support	Yes	Yes	Yes	Yes
Technology as a basic basis	No	Yes	No	No
Implementation of Smart City in the 20th century	No	Yes	No	No
Strong government involvement	Yes	Yes	No	Yes
Primary centristically oriented models	No	No	No	No

Source: own processing according to case studies

All four selected cases achieve common elements of quality of life, sustainability and support for management and decision-making in cooperation with citizens. Only Singapore has a clear definition of technology as the basic basis of Smart City in its graphic form of the model. In terms of evolutionary development over time, the original concept was again in Singapore in the 1980s. Other cities are set in time for the development of the 21st century. The strong involvement of the government in building Smart

City projects in the field of management is achieved by three cities, except for New York, where the primary influence is mainly the private sector (business sphere). The graphical representation of models is dominated by the placement of people in the form of an equivalent element to technology, management, etc. No city has implemented a trend of centrist-oriented model that would portray people as input and a critical success factor. Only Stockholm stated in its strategic principle as a primary step the needs of the population, which must be reflected in the graphic design of the Smart City model. Ranking in the world rankings of Smart Cities further creates and strengthens its image of a world-successful city and co-creates its great reputation.

5. Conclusions

The issue of Smart City is a current trend of the 21st century. The connection between managerial theories and Smart City development approaches is obvious, but little explored. The operation and benefits are reflected in case studies from London, Singapore, New York and Stockholm. Main findings from the article:

- the key factors for success in creating Smart Cities are quality of life, sustainability and support effective management and decision-making.
- competitive advantages are achieved by those cities that perceive technology as a basis, were developed in the 20th century, and the government is regularly involved in smart projects.
- the opportunity for improvement is the implementation of centrist-oriented models to the needs and expectations of people, or all stakeholders.
- support for Smart City concepts has a positive effect on the reputation of the city and its managers in both traditional and online environments at the national and global levels.

The article pointed out the connection between managerial theories in the concepts of Smart City, including the identification of common and different elements of the researched issues.

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EVOLUTIONARY DEVELOPMENT OF MANAGEMENT THEORIES IN THE SMART CITY CONCEPT

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Abstract: *The aim of the article is to capture the evolutionary development of management theories in connection with the issue of Smart City. The theories used in Smart City concepts began to appear in the historical context, but in their modified form they are still relevant in the 21st century. Methods of secondary analysis and summarization of the acquired knowledge were used to fulfill the goal. The main finding of the article is that technology-oriented cities first began to focus more on the managerial aspect and the current trend is the citizens and their needs, which has a positive impact on their reputation management. The growing trend of citizens' mobility to cities generates the need to manage cities on the principle of centrist-oriented models. The management theories in Smart City approaches has a continuing trend, which experts predict until 2050.*

Keywords: *managerial theories, Smart City, evolutionary development, history, trends*

1. Introduction

The global trend of urbanization and changes in the geographical curve represents the basis for the creation of smart platforms, including the context of Smart City.

Over the last five years, smart agglomerations have accelerated, supporting the multicultural aspects of cities. However, the development and concept of Smart City goes deep into the past and is closely linked to the evolutionary development of managerial theories [6].

2. Methodology

The method of secondary analysis of the literature was used in the article. Relevant sources were selected by searching for keywords such as "management theories", "smart city", "evolutionary development of management as a science" and the like. In addition, a summarization method was used.

3. Results

3.1 History

The first mention of the city, which is synchronized on the basis of technological development, is found in Francis Bacon's book New Atlantis from 1627. The Renaissance ideology of the intelligent city is based on a publication by English scientists from 1620, called the Novum Organum Scientarium. In this work, science was defined for the first time as "a necessary instrument that is controlled and influenced by man," [5]. Bacon's Smart City was named Bensalem. The contents of the book New Atlantis represented a utopia that is commonplace in today's world [5].

Townsend, on the other hand, is of the opinion that the first smart cities were in Egypt, or possibly in the 15th century, when letterpress was developed. Harrison and Donelly argue that "the primary impetus for the emergence of either historic or contemporary Smart City was to promote economic development at the global level," [9].

From the time and geographical point of view, the development of Smart City and management theories is not homogeneous in the given issue. Two evolutionary milestones are the industrial revolutions at the end of the 18th century and the beginning of the 19th century [5]. The initial vision of an ideal industrial city was presented in 1898 in Howard's The Garden Cities of Tomorrow [2]. The first industrial revolution dealt with the development of cities from a technological point of view. The second wave favored synergies between industry, economics and cooperation between scientists and the primary sector. These elements form the necessary basis for cooperation even today, as they take the form of stakeholders for Smart City approaches. During the industrial revolutions, the theory of management also began to develop extensively (Taylor, Ford, etc.) [5].

The connection and dependence of technological and regional development was declared in his book The City Rises by the Italian representative of futurism, Umberto Boccioni, in the period 1910-1911. Already in the 20th century he predicted robotics and its negative aspect, e.g. some jobs will disappear as artificial intelligence will start. He considers technology to be so-called "Red horses" that trample people and take their lives [5].

The understanding of futurists was based on the characteristic elements of speed, change, technology and violence. They perceived the concepts of developed cities as man's victory over nature. Bauhaus and Le Corbusier highlighted the positives of technological change. As early as 1922, Le Corbusier created a model of a smart city for 3 million inhabitants [2].

The idea of the city, which will be "smart", will contribute to a higher quality of life and the protection of limited resources based on the principle of using ICT technologies, was initially developed 20 years ago. The smart city is built on the basis of digitization and application of ICT to everyday life. Development is

conditioned by gradual evolutionary development from the local to the global level. The five steps form the basis for the strategic management of the city, how to correctly determine the ways to achieve the set goals. The dimensions of Smart City development can be a critical success factor, but also a problem depending on the quality of management and the application of management theories in practice [6].

Modernism promoted new technological conveniences (such as light bulbs and electricity) in connection with the better cultural enjoyment of the citizens of the 20th century, mainly in Western Europe. The period of electricity was called the "War of Currents". Electricity has rapidly supported the development of smart cities and digitization. The use of telephones, radios and television formed the basis for ICT and integrated Smart City projects in the 1970s [5].

First real Smart City based on data and its computer processing is considered Los Angeles. This "computer city" began its "smart" development as early as 1974. The second oldest Smart City is Singapore, which began to develop as a "smart island" in the 1980s [5].

Marshall McLuhan predicted in 1964 that "cities will disappear due to their growing disconnectedness," [5]. In 1997, Marvin followed up on McLuhan's vision and outlined two elements of the fall of cities [5]:

- dematerialisation,
- decentralization.

However, Mitchell (1999) argued that those cities would survive that were "electronically connected and globalized," [5].

In the 20th century, the German philosopher and father of theory of criticism, Mark Horkheimer, argued that urban development is conditioned by an aspect of sustainability that is very subjectively understood. The idea of environmental protection for future generations must go from the inside out, i. j. from individuals, to groups, city, region, state to the world. This perception enriches Bacon's original concept with the socio-environmental elements of Smart City's development in the modern theory of its management [1].

From a historical point of view, the approaches of smart cities have developed in three waves - prescriptively, critically and empirically [8].

Prescriptive studies highlight social and technological opportunities for fast-growing cities in terms of urbanization trends. The effect of building "smart" concepts is higher sustainability and quality of life. Hollands in particular focused critically on the analyzed concept, claiming in 2008 that “Although Smart City affects human capital, communities and team learning, it is largely limited by the agendas of politicians who are technologically focused on the so-called hi-tech urban entrepreneurialism, e. i. for-profit sector, ”[8]. Representative of empirical studies is Meijer and his Smart City called "Datapolis". The results of his critical analysis pointed to the fact that a smart city and its management depend on technology, social interactions and local conditions. The concept should be understood as a social phenomenon and not as a result of social changes and structures [8].

Technocrats, as technical specialists, only profess standards set by experts. For them, monitoring is a process that ensures objectivity and residents play the role of consumers. The critical perspective consists of the idealistic standards of the city's elite, which, however, is oriented only towards a high but short-term effect, which does not support the long-term sustainability of the city. Residents feel social inequalities, which is what they hold. the role of "victim". A promising wave supports a win-win strategy, e. i. benefits for all stakeholders, where each acts as an active subject of participation, cooperation and interaction. Monitoring is perceived as a necessity for continuous improvement of processes and city management [8]. In terms of management theory, it is important to focus on planning, management tools, methods and procedures for management and decision-making in the city, and a key element of development is monitoring. Building Smart City cannot work without the effective management of its council [8].

Today, more than half of the citizens live in cities. Positive elements of the evolving urbanization trend are higher GDP or quality of life. The disadvantages and challenges for future generations is in particular to find innovative ways to protect the environment and limited resources, e.g. Smart City approaches. A smart city depends on synergies between ICT, management and stakeholders [11]. Nam and Pardo see Smart City as an innovation that reaches the level of risk that management should manage. Interoperability, ICT support, transparency, digitization and knowledge management at the enterprise level can significantly affect the efficiency of Smart City. Based on the historical context, it has been shown that the intelligent city does not represent a revolution, but an evolution across time in connection with the development of management theories.

3.2 Present

Awareness of Smart City has a growing tendency, especially depending on the trend of mobile phone and Internet use. Attitudes towards Smart City approaches are influenced by culture, economic situation, lifestyle of citizens, etc. [6]. The current development of Smart City concepts depends on the level of city management, in terms of technical and social skills of managers. The effective combination of Smart City approaches and project management at the strategic level of the city is one of the main critical success factors in the field of management theories [1].

The first level of the framework includes the classic management functions of planning, organizing, securing people, leading them and controlling them. The second part contains indicators that affect Smart City projects and their implementation in practice. The size of the project and the Smart City index affect the style, level and success of city management. Important elements are building knowledge management and supporting a holistic approach to solving problems with the "smart" attribute. It is appropriate to know the classical theories of management and modernize them for the current needs of smart agglomeration management [1]. Smart City Theory is based on four conceptual structural elements [2]:

- push-based technologies,
- pull-based applications,
- urban development,
- an economy based on knowledge and innovation.

The rapid growth of the population supports the emergence of Smart Cities. The strategic management of the city must address the issues of consumption of limited resources, the creation of participating communities or plans for implementation, development and stability of the sustainability of the selected city or the entire region. Knowledge in the field of managerial theories and public administration management is still limited and insufficient in the 21st century, which creates an opportunity to deepen this knowledge and build a new "knowledge" database for the development of approaches and management methods with a trend of continuing orientation to Smart City [8].

Interconnection between the issue of Smart City and public administration management is a trend of the 21st century. This issue in the form of the so-called "Urban audit" has not yet been analyzed. Understanding intelligent agglomeration in terms of measuring, quantifying and evaluating results will ensure a rational, transparent and accountable form of performing managerial functions. Grossi, Meijer and Sargiacomo argue that "Smart City is a collaboration between the strategic management of the city and its citizens, which has a significant impact on the promotion of research-based management and decision-making," [8]. Public administration management at the city level works on processes of interaction and cooperation of all stakeholders, through four dimensions [8]:

- strategy (dynamic flexible approach based on resource efficiency),
- cross-sectoral collaboration (cooperation, participation, leadership),
- collaboration within one industry, so-called Inter-institutional collaboration,
- population (attitudes, opinions, expectations, etc.).

The use of ICT technology in the strategic management of the city simplifies, speeds up processes and contributes to the generation of higher added value. A holistic approach to smart governance reflects the principles of community building, effective vision and strategy management, public value added, asset management and sustainability (economic, environmental and financial) [8]. The primary limitation of managerial theories in Smart City is the lack of focus on decision-making processes and theories. In most cases, city management prefers critical perspectives that are oriented towards political rather than managerial theories [8]. In 2018, Hersovici appealed to the perception of Smart City "in the form of an intelligent urban management system, which should be developed and maintained through best practice," [8].

The creation of Smart City concepts has a positive effect on the city's reputation. Support for initiative projects increases awareness, image, higher reputation attracts new investors, citizens or generates creative ideas in the form of start-ups. The best practice in the field of Smart City reputation is India [12, 13].

3.3. Future

The strategy of Smart City management in the future will be based on 8 elements, t. j. value, diversity, human needs, populations, participation, theory of change, quality of life and proactivity [10]. Further development will be influenced mainly by two megatrends - increasing the population in cities and changes in the demographic curve, i.e. aging population [7].

In general, there are three generations of Smart Cities, where the last of them presents a futuristic perspective [4]:

- Phase 1.0 - technology driven (past),
- Phase 2.0 - focused on city management, which uses technology platforms (present, 21st century),
- Phase 3.0 - centrist-oriented smart cities primarily focused on citizens (future 2030 to 2050).

Research conducted at the end of the 20th century reveals the main trends concerning management theories for the Smart City area in the 21st century. These include [3]:

- flexibility,
- promoting a positive reputation of the city,
- adaptability,
- openness,
- transparency,
- support for Smart City clusters,
- cooperation,
- participation,
- motivation,
- positive acceptance of change,
- preference for alternative energy sources,
- the link and coherence between the operational, tactical and strategic levels of management,
- modification of classical management theories into their modern form,
- vision sharing,
- monitoring of Smart City indicators for continuous improvement,
- sustainability,
- community creation,

- taking into account the views of citizens,
- support for science and research,
- use of ICT and Big data, IoT, artificial intelligence, etc. in support of management and decision-making at all levels of management,
- focus on models that are primarily population-oriented.

5. Conclusions

Managerial theories are evolving over time, their connection with the issue of smart cities is considerable, but currently little covered. The principles that were used for the management of workers in the 19th century work in their modified version even today, thus enriching science as management with new modern theories and approaches. The critical elements for the success of traditional management theories, the form of which has been modified to meet the needs of the 21st century, are trust, access to change, community building, and the satisfaction of basic human needs according Maslow theory. Trend trends point to a continuous increase in the urban population, including persistent changes in the demographic curve. Modified versions from historical development can integrate new management methods, create, stabilize or increase the reputation of Smart Cities and mediate the creation of a theoretical basis for the issue of building sustainable cities in conjunction with public and primary sector management.

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DIGITALIZATION OF DECISION MAKING IN SUPPLY CHAIN MANAGEMENT

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Abstract: *Currently digitalization is a game changer for entire industries. The technological progress of digitalization is accelerating and will change the entire understanding of doing business from an analogue to a digital setup. In this new business environment, a core task for managers, decision-making, is changing. This task will face a tremendous change toward automized and autonomous decisions. The question, if an automized or more digitalized decision-making will improve the performance of an organization will be reflected in this paper. For a clear focus, the relevance of digitalization of decision-making will be projected in a supply chain environment, to deliver resilient results. The quality of the developed research model will be tested with an adequate empirical research method, the structural equation model analysis. The empirical analysis will show significant results and is able to deliver answers in an appropriate manner. The results show, organizations should use the recently given technologies and tools to implement digital approaches for decision-making in organizations, to increase the quality and the efficiency of the decision-making process. Finally, the conclusion of this paper is a viable verification of the view on digitalization of decision-making in supply chain management and has a positive correlation to the efficiency of decision-making in organizations.*

Keywords: *Decision-making, digitalization, digital supply chain management*

1. Introduction

Digitalization is today a new paradigm. „Data-driven transformation is becoming a question of life or death in most industries“ [1] , which means the competitive landscape will move into a new structure. Businesses need an answer to new challenges and consumers experience the trend with „smart, connected products having three core elements: physical components, smart components, and connectivity components.“ [2] In the 2016 “Global Perspectives Barometer”, about 800 “Leaders of Tomorrow” cited “hierarchy that slows down decision-making” as the second most substantial risk for established companies in today’s fast-paced markets.“ [3] This means, digitalization will tremendously affect decision-making and change the process, including the quality of results. From an historical view, early economists were focusing on utility maximization, from Adam Smith to von Neumann and Morgenstern, and postulated a rational approach to reach efficiency in an organization. Later, these ideas were blurred by organizational or psychological research, e.g. from H.A. Simon with his contribution to „bounded rationality“ [4] and the view on limited cognitive intelligence or an emotional view from Kahneman and Tversky, with a clear scope on behavioral aspects of decision-making. [5] These outcomes of the latest researches established different pictures on decision-making, not necessarily utility maximization. But today, latest technology with huge processing power is able to design decision models and operate them to reach utility maximization. Depending on the automation degree of decision-making, machines are able to decide instead of human beings, related with higher efficiency and accuracy. First time in history, the ideas of early economists are becoming real by pure usage of digital power and algorithmic models for decision-making.

Today’s view on digitalization is significant, because it will change entire economical structures. A new type of decision-making is necessary and the analysis of the current status of decision-making is a starting point to discuss the new way of making decisions. Supply chain management is meanwhile a strategic function in organizations and affected by digitalization. Digitalization of supply chain management will deliver efficiency gains with new ways of collaboration and digital tools. „Digital transformation requires a digital mindset and new approaches to dealing with both, decision risk and decision speed.“ [6]

2. Theory

The theoretical aspect of decision-making in the context of digitalization is worth to analyze in the current environment of supply chain management, because or its management relevance.

2.1. Theory of Decision-Making

Decision-making is a wide field in science and practice, with a long tradition and distinguished views on decision theory. „The basic idea that humans make choices and that these choices are informed by assessing alternatives in terms of their consequences underlies much of contemporary social science, not to mention common sense.“ [7] The first idea of decision theory reaches back over centuries. Rational models were discussed from the neoclassical economists (e.g. Adam Smith or Max Weber) with an idea on rational behavior of agents which maximize utility – as homo oeconomicus. The theories of Pascal or de Fermat show a calculation of probabilities and Bernoulli laid the foundation of risk science by examining random events. Further developed by von Neumann & Morgenstern economic behavior in a mathematical model, decision-making follows utility maximization. One of the

most popular is still the theory of games and economic behavior. This theory of von Neumann & Morgenstern explains a rational behavior of market participants (either consumers or entrepreneurs). Consumers aspire maximum utility or satisfaction and entrepreneurs aspire maximum profits. Today the mathematical models of rational theories are further developed on the ideas of von Neumann & Morgenstern's theory. [8] Over the last decades a more interdisciplinary scientific view developed (economics, psychology, sociology, philosophy, mathematics, computer science and statistics), with different approaches. The opposite of the rational view is a behavioral view on decision-making. In the late 1940ies Herbert A. Simon discussed the theory of bounded rationality and laid an essential foundation for a development of decision-making theory. [9] This theory is based on a certain influence of human attitudes and not on pure rational decisions. A deeper view in psychology shows that theories on behavioral economy are currently popular, because human behavior is an important part of an organizational decision-making process. In the 1970ies of the last century, David Kahneman and Amos Tversky developed amongst others the groundbreaking idea of prospect theory. The idea of prospect theory is a more human view on decision-making. The theory of Kahneman and Tversky demonstrates that market participants do not act as rational as assumed, i.e. discussed by early economists. The effects between gains and losses are not symmetrical distributed in prospect theory. [10]

2.2. Theory of Digitalization

"Digitalization refers to the practice of taking processes, content or objects that used to be primarily (or entirely) physical or analogue and transforming them to be primarily (or entirely) digital. The effect of digitizing processes, aside from potential efficiency gains, is to make processes more tailorable and malleable". [11] Not only based on data, moreover targeted on markets, organizations and processes, digitalization will deploy its full value to businesses and industries. In the last century a "computer" was an employee calculating tables the whole day. Currently the speed of development is increasing, either the trend of "Industry 4.0" with full automation of the production flow or artificial intelligence that robots tend to make autonomous decisions and developed self-awareness and self-maintenance. Robots and machines are moving into our work environment and will replace human work and human decisions. Referring to the effects of digitalization, this trend will change the attitude of making business and making decisions. Flexibility and transformability are key attitudes of successful organizations in the future and drive them on the road of digitalization. Digitalization will have an effect on customer structure and behavior, increase the efficiency of operations including the supply chain and at the end may change the entire business model.

Important to understand are the 4 areas of digital transformation: smart data, automation, integration and digital customer access. These 4 areas have to be in scope of decision-makers, because these are the corset of the digital change. [12] Digitalization and more in detail, data are becoming more and more important in the periphery of decision-making. As explained above, there are more aspects of decision-making, e.g. experience, heuristics and „gut feelings". Today, in a highly competitive environment, with the need for fast and high-quality decisions, humans are overstrained to cope with these complex requirements. Automated or even autonomous data usage provides a competitive advantage for organizations to succeed in their process of decision-making.

2.3. Theory of Supply Chain Management

Supply chain management is a growing discipline in economic science and practical business world, driven by efficiency efforts of organizations to survive in a competitive environment. A trend of organizations to focus on their core activities, and to spread their product portfolios including services, supply chain management creates opportunities to succeed. Influencing factors like complexity, response time, organizational requirements or even technological developments have to be managed. To analyze complexity in the context to supply chain management, the trend of globalization is the most obvious one. Management of global sales and distribution networks is a challenge which should be covered by a supply chain management concept. Market requirements, the competitive situation and new product features are relevant drivers for new approaches in collaboration between supply chain management and digitalization. Shorter response time in the market drives supply chain to a higher degree of automation. A proper supply chain management is mandatory, because shorter product life cycles will tolerate less failures. Nevertheless, the necessity for efficiency is not limited to one single global organization, the scope is moving toward an end to end value chain with all related parties. Supply chain management in combination with digitalization will have an impact on these new cross-organizational structures. Finally, advanced technological progress and development of new technological applications have created new opportunities for organizations or value chains to reach a more competitive position in their industry. [13] As an example, the technology of blockchain with all related transactions is one driver in the supply chain environment to gain efficiency.

3. Model Structure and Empirical Setup

Taking the described topic into scientific context, the paper describes a relationship between an intelligent digital setup for decision-making and the efficiency of a decision. An intelligent digital setup is a "clever" customized system for an organization which enables an efficient process. The type of customizing has to respect the structure of the organization, e.g. industry, customers and the organizational setup, because every single organization has its own perfect fit into its competitive environment. A digital setup means, all procedures of an organization transferred into a digital context from a

former analogue setup, either fully digital with machines or executed by a cyber-physical-system. The efficiency of the decision has to be taken into context to the origin of the decision, compared to an analogue environment. By setting up a research model, this differentiation is relevant and the significant difference of both conditions have to be evaluated for a validation of the analysis. The outcoming results might be manifold, but have to be in line with the research model, therefore not only the status of both environmental decisions types is relevant (digital or analogue) also the approach of measurement. The following generic dependency model (figure 1), with the independent variable "x" is the mathematical representative for "degree of intelligent digital setup for decision-making in an organization" and the dependent variable "y" is the mathematical representative for "efficiency of decision-making". For a research model test in a real environment, there should be a more detailed definition of testing objects. For the model test, a research case is defined in the area of decisions in supply chain management, based on a supply chain management model.

Generic Dependency Model with Underlying Variables

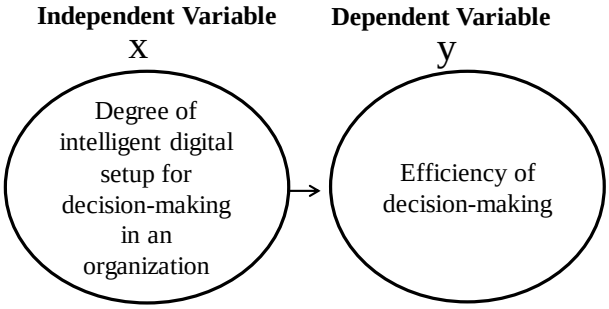

Figure 1: Generic Dependency Model

In the following flow chart (figure 2), the detailed process with all independent variables $x_{1\text{-}6}$ is defined. Starting with the customer forecast (x_1), as an external event, the process will flow into the organization's environment and is becoming an internal process, which means a higher level of control for the next steps are possible. The availability of the requested products will be checked, if they are available from stock (x_2). If the product is not available, the production planning (x_3) and the sourcing process (x_4) of materials has to be steered, either manual or digital. To finalize this process, the customer order confirmation (x_5) is the last step. To focus on control opportunities, the process is moving in this last step again from the internal organizational environment to the external customer environment. In this questionnaire the relevance and the proportion of digital characteristics will be analyzed. All above mentioned process steps are manual or digital possible, and need to be evaluated by each questionnaire's participant. Even important is the measurement of the digitalization degree from an outside perspective into an inside perspective. The question how digital is the interface to the customer and how digital is the internal process seems quite important. The expectation, the interface to the customer is not on a highly automated level today, is an assumption and the internal process may demonstrate more digital characteristics.

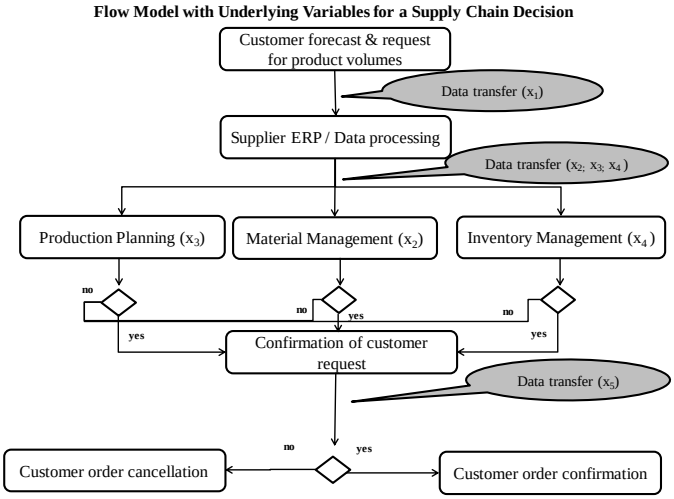

Figure 2: Flow Model of Supply Chain Case

The structure of the dependent variable y is defined as "digitalization goal" (y_1), "digitalization achievement" (y_2), "digitalization overall evaluation" (y_3). The KPIs within the independent variables are set as "cost reduction", "working capital reduction" and "revenue growth", to ensure a proper measurement of the model.

4. Results

Analyzing the generic model structure itself, if the model reflects a robust setup with its underlying independent and dependent variables, a structural equation model (SEM) is a possibility to examine these relationships. This model is a general statistical modeling tool, which is mainly used in behavioral science. It is a combination of factor analysis and regression or path analysis. The focus of structural equation modeling is driven on theoretical constructs, which are represented by latent factors and the relationships are expressed by regression or path coefficients between these factors. SEM implies a structure for covariances between the observed variables. SEM is often visualized by a graphical path diagram (figure 3) and the model represents a set of matrix equations. The advanced view of a SEM is the approach to examine more than one independent variable. Regression methods are limited to only one dependent variable. In the described research model is more than one dependent variable and therefore the SEM delivers high-quality results. The background of comparing all these dependent variables is to analyze, if there are any dependencies between these variables. A common layout is given in the following figure, by using a path diagram and showing the structure and dependencies graphically.

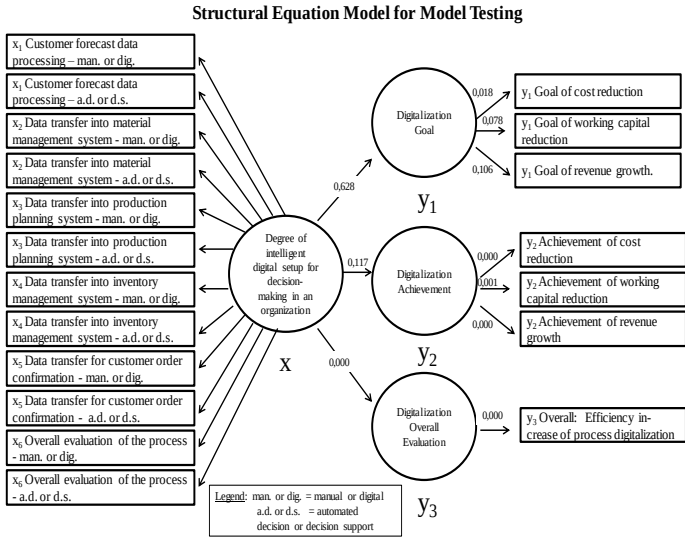

Figure 3: Structural Equation Model for Model Testing

The values of figure 3 exhibit the significance of the tested items. Independent variables x_{1-6} are representing the process steps of the supply chain case, starting from the incoming data of the customer forecast, then transferred into the system of production, material management and inventory management, and the data flow of customer order confirmation. The dependent variables y_{1-3} are representing the KPIs of cost reduction, working capital reduction and revenue growth in the variables goals and achievements. As a general result of the analysis of the structural equation model, a model with significant items is given. The relationships expressed by the path coefficients are representing the factor relations. Overall this shows a strong design of the questionnaire, representing the research model with its variables. Therefore, a structural error of a wrong setup of the questionnaire is negated. This view implies, that the result of the questionnaire will deliver qualitative answers. y_1 (goal) is showing a high factor loading with a value of 0,628, which means that the model shows an appropriate level of accuracy. These stable factor loadings indicate a relevant setup of the model. y_1 is the representative independent variable "goals for digitalization" with the variables cost reduction, working capital reduction and revenue growth. The high factor loading refers to the level of digitalization. As a first result based on the SEM evaluation, digitalization of decision-making is influencing the goals for these variables. y_2 (achievement) is presenting a medium factor loading of 0,117, which shows a correlation in the SEM model. Therefore, the model implies references between digitalization of decision-making, but a lack between goal setting and achieving these goals. This leads to the view, that there are more effects than digitalization of decision-making on cost reduction, working capital reduction and revenue growth. Observing the environment of organizations, would contribute to this conclusion and the lack of transforming these goals to results. y_3 (overall evaluation) is showing a 0,0 in the factor loadings, which means for an overall evaluation are more external influencing factors relevant than digitalization of decision-making. As an overall evaluation, the theoretical model will be supported by the structural equation model. This indicator, to understand the accuracy of the model, should lead to further empirical analysis.

5. Conclusions

The described empirical test with a structural equation model is a relevant test, to ensure a high-quality evidence of a theoretical generic model. As demonstrated, the results of the model test have verified the accuracy of the model itself and delivers high-quality results. High factor loadings are delivering a confirmation of the reasonable setup of the generic model, nevertheless low factor loadings exhibit that the model is not representing all circumstances of a real business environment. Both results are important for scientific understanding of a model and correlated model testing. Further examinations of the model are reasonable.

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CHANGES IN BROADCASTING TO KEEP A LISTENER IN COMMERCIAL RADIOS IN SLOVAKIA

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Abstract: *The article deals with new trends in private radio. It focuses on managerial changes in the two most listened private radios in Slovakia. Through weekly monitoring and observation, the authors deduced several trends that the radios were forced to do in order to keep up with current trends in the field of media management and marketing. The article focuses on the research of the news programs Fun Radio and Radio Expres. It also describes commercial radio broadcasts in Slovakia, characteristic features and basic radio news genres that are used in radio practice. As a result of limited listener's attention, the need to process information fast and the ambition to be the first one to provide information to their listeners is the main goal of commercial radios to keep the listeners.*

Keywords: *radio, commercial broadcasting, journalistic genres, news service, trends in radio broadcasting*

1. Introduction

We live a fast life in which the recipients cannot correctly analyze media content and as such hoaxes, inaccurate information and disinformation appear. Radio broadcasting, needed to adapt promptly and transform according to current requirements of media market. Private radio stations create their program composition based on agency ratings' results. Broadcasters consult agencies not only for the music format but also for the overall broadcasting to fit a certain target group. These changes occur primarily in commercial radio stations in Slovakia. The aim of our article is to analyze the news programs of commercial radio stations in one week using qualitative methods in the period before the corona crisis and then use media research to formulate new, current trends that are evolving due to the need for change.

1.1 Commercial radio broadcasting

Since the establishment of radio broadcasting, especially European radio broadcasting, radio stations were administered by state. As such, individual European states had a broadcasting monopoly of radio as a new medium that was swift and brought information immediately unlike the newspapers. The USA chose a different path to follow. Radio broadcasting in the USA was independent and whoever had resources might have owned a radio broadcasting. Mainly, there were small radio stations (the oldest radio station in the USA was KDKA in Pittsburgh) [1].

Nowadays, nearly in all democratic countries there is a dual broadcasting system. It is a system in which public media owned by state operate side-by-side with commercial media. Public institutions are financed mostly by means of fees for public service and from advertisement or state contributions. On the other hand, commercial media are on the market for financial profit. If a commercial radio wants to broadcast, they have to fulfill legal requirements set by each individual state. Generally speaking, a radio station has to ask a legal body who controls broadcasting and retransmission to be granted a frequency. One transmitter is definitely not sufficient to grant signal to a whole state. Tens of transmitters are needed and that is money consuming. At the same time, it increases the reach of audience. There are several types of radio stations according to territorial reach:

local broadcasters – broadcasts in a small territory; *regional broadcaster* – it is transmitted to less than 30% of population; *multi regional broadcasters* – more than 30% but less than 80% of population can get its signal; *nation-wide broadcasters* – the signal is transmitted to 80% of population [2].

Television broadcasting caused downfall od radio and nowadays both of these media are downplayed by the Internet. Nevertheless, radio stations succeed to stabilize their position on the media market. The advantage of radio is that it is an auditory media. While listening to radio, we employ one sense only, and it is hearing.

Commercial radio stations rely on advertisement. Advertisement is used to increase sales of goods and service. An advertiser may choose to target advertising locally or they may opt for a regional radio. Big national radio stations offer the option to target one specific region only. An advertiser may choose to stream their advertisement wherever the radio station has broadcasting coverage or in specific region only.

Radio stations started to profile themselves based on their listeners' preferences, too. They may reach those listeners who prefer a specific music style or genre. This phenomena is called radio formatting. A radio may profile for a wide range of listeners, men, women, youngsters, older folks, rock fans, etc.

Commercial radio stations are nowadays highly professional. They regularly run surveys via agencies to get to know their listeners' music style and content

preferences. Simply said, there is no spot on the radio that is placed without prior investigation if people were gonna like it or not. On the other hand, expensive surveys bring radio stations huge masses of loyal audience. We live the era of huge broadcasting coverage of radio stations. If we try to search for small radio stations on national media markets we find out that there are none. Local and regional radio stations keep on dying out. Small radio stations are money demanding and moreover, advertisement is interesting in big media only. Still, there are various options on the market.

1.2 Radio news services

Each radio media product can be categorized into so-called *journalistic genre*. Journalistic genres are known for being able to inform immediately about an important social event or any interesting happening in Slovakia or abroad. News are among the most popular radio programs and the most common topic they deal with are political events, statements, economic results, cultural actions, sport news, records, etc. It provides information about various events that may be considered to be important, useful or interesting for the recipient. This also clarifies the fact that the basic features of media (the fact that they are important and useful) are considered to have social function, too. News should help us to get to know the world, evaluate possibilities, help voters to decide, etc. The composition of news service broadcasting continuously changes as well as expectations it should meet. The maximum length is from three to five minutes and individual spots are thirty to sixty seconds long. The presenter profits from one minute time frame. The main news service lasts twenty minutes and it consists of several blocks of different content.

Features of radio news service

News service in radio broadcasting should primarily provide up-to-date and immediate information. Other features of radio newscast are that it should be: comprehensible, brief, accurate, clear and that simple language and stylistic elements should be used only [3]. News service should be operative, immediate, frequent, unidimensional, nonrecurrent, specific and redundant [4].

A report plays an important role not only in radio broadcasting but in print media, too. As such, we will have a closer look at this journalistic genre. *„… radio report is an immediate, brief, transparent and comprehensive announcement about a current event or happening that is delivered by means of auditory perception,"* state E. Chudinová and V. Lehoczká [4]. Other stated specifications of a radio message are that it is immediate, universal in topic, regular in frequency, continual, it is segmented into multiple contents and increased redundancy. It should answer the questions: Who? What? When? Where? And secondary questions, too, such as How? Why [3]? There are six basic types of news messages in traditional genres division: short, expanded, official, referral, dialogic and fictional [5].

A flash message answers the essential questions. It is referred to as a flash or a signal message. [3]. It appears in radio broadcasting as an immediate, first-hand information [6]. It actually is an introductory headline. *An expanded message* or a commented message answers all six investigative questions. There are three types of expanded messages: interpretative, continual and commentary [5]. *A short message* answers the questions Who? What? When? And Where? A short message (also called *a miniature message*) provides information about an important social event. It comprises essential information about the event, however, message's brevity never prevails over its clarity [6].

A complex message has multiple mutually dependable parts which must be compatible (in time and place). *A frame message* is transparent. It informs about an important event. *A situation message* is, compared with a frame message, even wider in range [3].

Radio news broadcasting is categorized based on the source of information (agency, author or official) or composition is divided to notion-related composition in which a logical or the most excitatory fact comes first. This is called the Inverted Pyramid principle and chronological composition that can be either chronological, contra chronological or causal [3].

2. Trends in news service in commercial radio broadcasting in Slovakia

The changes in commercial radios affected the length of news service programs or blocks as well as their preparation and usage of various radio broadcasting journalistic genres. A lot of them are not used anymore. Hybridization of genres takes place and new journalistic genres develop.

In course of our research (executed from April 1.st to October 1.st 2019) we have run a qualitative content analysis of news service of all commercial radio stations which took part in MML measuring and we found out multiple things that can be generally interpreted as follows:

Extinction of traditional news service broadcasting offices – in the past, there were multiple employees such as presenters, announcers, editors who brought up topics, processed field spots and prepared news service programs. Nowadays, commercial radio stations have so-called "news reporters" only for presenting news who, not only prepare the news service from various sources[1], but also interpret these by themselves. There exists a cumulation of multiple job positions in a broadcasting office.

Small broadcasting offices – currently, there are approx. 5 to 6 people in news service editorial offices of commercial

[1] Note: These are agency services, internet resources, but also social networks. In particular, foreign representatives of political and public life use, for example, the social network Twitter to communicate public statements. US President D. Trump regularly informed the public about the major steps through his Twitter account.

radio stations[2] (the data applies for the biggest radio broadcasting stations, though), who work on shifts. Throughout the day they can prepare simple news service journalistic genres for news service blocks. In primetime, in the morning, big commercial radio broadcasters profit from two news service presenters at once. These presenters usually cover news service blocks and traffic reporting block. Throughout a day, one person is enough to cover news service blocks. In small regional commercial radio stations, they do not have any news service editorial offices at all. A presenter prepares the news and reads them by themselves, too.

News from news service agencies prevail – information and news from news agencies are the headliners of news service on the radio. Agencies provide audio recording, too. These recordings seem to convince the listeners that a radio editor was present at the happening. Individual reportages, assemblages or interviews as genres have completely faded out of commercial radio news service broadcasting[3] (except of discussion programs). They get further audio materials by means of phone calls which are subsequently implemented into news service broadcasting.

A cut off on field engagement – thanks to fast and complex information coming from agency service and because of media convergence, commercial radio stations nowadays do not have to rely on their own editors in field who would get information from the happening site. News agency service as well as social networks have replaced in field editor's job position. Most of press conferences are streamed live, online via Facebook. Surely, it is worth to send an editor in the field of a big sport event such as Olympic Games or the World Cup so that they are present on the spot. Though, only special, occasional events are covered this way. Similarly it works with social events such as elections.

High competencies related expectations – this phenomena is a result of economic point of view prioritizing cutting on expenses but at the same time making the work more effective. Commercial radio stations broadcasting is nowadays run by a few people whose job related functions cover multiple professions, in fact.[4]

Time-consuming management – is a result of rationalization and professions convergence. A current day editor has to search for topics, process information, cut the audio accordingly and in some commercial radio stations even read them by themselves. News service preparation became a time consuming matter. The biggest commercial radio stations stream news service during public and national holidays just like any other day and they even provide news service at day as well as night time.

Strengthening the position of news service presenter – news service presenter engages in live streaming not only in the form of news service blocks, though, along with radio presenters they cover the introductory part informing the listeners of what comes next. It is called "teasing" which refers to outlining the information, news to follow. This way, the radio broadcaster prepares the listener for upcoming news and try to get their attention.There are multiple types:

- *in form of a monologue* – a presenter/ a news service presenter informs the listeners of what comes in upcoming minutes. Generally, they pick up one particularly interesting news from news service, road and traffic reporting or weather forecast and they speak about it. This type of teasing is used for other events, too, such as columns, competitions, etc.
- *in form of a dialogue* – a presenter along with a news service presenter mentions one or more topics from the news service block that are treated more in detail in the news service block. Their mutual debate is rather informal. In radio, teasing is employed in form of a dialogue in between a presenter and a presenter of news service, most often shortly before the end of a program or an air broadcasting.

In commercial radio broadcasting in Slovakia, it is common that a news service presenter appears except of news service blocks or teasing in regular streaming along with the presenters. The reporters often engage after the message is delivered and they become a part of streaming after news service blocks, too. Presenters treat them as equal discussion partners and ask them for their opinion. Such a trend is present, more than anywhere else, in morning primetime broadcasting.

The influence of infotainment – elements of infotainment appear in news service of commercial radio stations in Slovakia just like anywhere else. Information are delivered as entertainment and they must be catchy. Background music is added to reporter's voice. News service blocks contain shocking tabloid news (Fun Radio).

Time dedicated to news service – as per rule, commercial news service does not take any longer than 10 minutes. The most interesting information are chosen to be communicated. The streaming structure allows daily 2 or 3 news rich in content at maximum (in the morning, during lunch time and in the evening). In such a case, news service blocks take less than 10 minutes. Otherwise, the news are shorter and more dynamic, they usually no not last longer than 5 minutes. News during the day tend to repeat. During th day, the reporters just change the form of news provided, they add up some information in form of continual news.

[2] Remark by the authors: Radio Expres currently has 12 editorial staff. Such a number is the exception rather than the rule [8].

[3] Note: An exception is Rádio Expres, which uses these genres in „Infoexpres plus", ie in „big news". These genres do not appear at all in other nationwide commercial radios [9].

[4] Remark by the authors: It is, for example, the complete disappearance of the position of technician who was in charge of mixing music, sound graphics or various sound outputs. These skills have been acquired by moderators who, in addition to preparing the material and interpreting it, must also tempt the check-in technique.

Hourly news service blocks – in commercial radio stations, the news service is broadcasted regularly every hour. They are planned for the first minutes of every new hour. Traffic reporting appear in news service blocks every 30 minutes. Bigger radio stations have all day news service coverage, night news service is covered, too. Smaller radio stations concentrate news blocks broadcasted every 20 minutes (Radio Expres).

News service starts with headlines – headline is not a journalistic genre unlike a flash. These are signal news to inform about the most interesting news in upcoming news service block. There is a distinctive background music, sometimes there appears a short but distinctive jingle.[5] There are a few reasons for it. The news should be clearly divided one from the other and it serves the editor, too. The presenter has time to change the voice tone accordingly. From negative news accompanied by some profound music to positive news when they may smile.

Sport, weather forecast and roads and traffic reporting – all mentioned programs are part of news service block. The order of their appearance in broadcasting differs according to radio station.[6] It depends on radio format and marketing strategy.[7] Exceptionally, there appears a phone message in sport news but only bigger commercial radio station with bigger editorial offices could afford it, such as Radio Expres in Slovakia. This genre is used in case of World Cups or other important sport events. Weather forecast is planned ahead. There is a rule that morning weather forecast updates the listeners on actual weather and forecasts it for upcoming hours. On the other hand, in the afternoon or in the evening, weather forecast for the night or upcoming day is presented. There appear phone calls, too, usually from Slovak hydrometeorological institute whose employees provide first-hand information to listeners. In case of roads and traffic reporting, the order of information varies for each radio station, though, the logical order of events is preferred. Traffic information comes from these sources: *radio station's own traffic reporting* – Radio Expres and Fun Radio have their own editorial offices that gather data from listeners and interpret them for their own radio station purposes as well as for commercial purposes so that they can sell these information further;[8] *processed traffic reporting* – These information are bought from various external companies, such as Stella centre, or other radio stations e.g. Zelená vlna RTVS, as public medium provides the service for commercial purposes, too; *road and traffic information* – The application Waze is often used as it provides full-coverage valuable data on traffic which are comparable to data from the biggest commercial radio station's own traffic reporting.

Weather forecast and traffic reporting is often used for commercial purposes to sell sponsored messages as these cannot occur in news service by law.

Auditory graphic – it is clearly separated from other broadcasting. It corresponds and comes from audio identity of the radio station. In news service, division jingles are used as these, for example, separate headlines or actual news from the rest of news service broadcasting. Sport, weather forecast and traffic reporting have their own auditory graphic so that they are clearly divided from other broadcasting.

3. Conclusion

The analysis clearly showed that news service has undergone several major changes. We found significant changes in the analysis of news programs in several sections. The length of the reports, elements of infotainment in Broadcasting, the diversity and adherence to the cleaners of journalistic genres, the process of preparing news and fieldwork or the change of editorial office. For example, a presenter who used to be an announcer is now responsible for news production, material recording, and sometimes even for a new genre creation such as an assemblage or a reportage. The news is supplemented by sports news and weather. They also change the background music. The reports also include a transport service, which is created within the editorial office, but in the case of other radios it can also be an external service that provides this service. News in commercial radio stations has transformed a lot and it still tries to adapt to new trends. Its ambition is to stay a stable part of media environment as it used to be in the past.

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[5] Note: News jingles usually have only a few seconds (1-3), refer in content to the name of the news block, or identify a radio station.
[6] Note: Radio Expres has a strict structure within the news block: news (domestic, foreign, sports), weather and transport service. Fun Radio is included in the news block: transport service, news (domestic, foreign, sports) and weather. In most commercial radio stations in Slovakia, there is the first form of sorting information, ie the same as with Radio Expres.
[7] Note: Fun Radio refers in its clause to the transport service with the formula: „Transport service, always first".
[8] Note: Current information on transport is taken over by TV Markíza from Radio Expres [7].

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NON-FORMAL EDUCATION AS A TOOL IN HIGHER EDUCATION MARKETING COMMUNICATION

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Abstract: *This paper describes various possibilities of non-formal education and its use as a tool in marketing communication of a higher education institution. The authors bring an overview of the current state in the theoretical background of university marketing, non-formal education, business simulations and their effectivity and usage in education processes. In more detail, the authors examine an example of using non-formal education of high school students as a tool in marketing communication and relationship building with stakeholders at the Faculty of Management Science and Informatics, University of Žilina, Slovakia. The chosen case study describes one event at this faculty – Online school of management and IT skills which took place online during February and March of 2021. This paper points to the importance of choosing the right communication and interactive approach of the lecturers to participating students. The authors described lectures and practical seminars of this event with the overview of the most important outcomes from the students' feedback collected in a survey.*

Keywords: *management, marketing, higher education marketing communication, non-formal education*

1. Introduction

The problematics of marketing in higher education has increased its importance mainly in the last decade. The need to communicate with potential students in some innovative ways even rose during the Covid-19 pandemic situation starting at the beginning of 2020. A lot of prepared activities in higher education marketing and marketing communication needed to be organised online. One of the most popular marketing activities at the Faculty of Management Science and Informatics has always been live education events for high school students from all over Slovakia. The pandemic situation had a strong influence on changes in such activities, meaning they had to be moved into the online environment.

The aim and purpose of this paper are to bring an overview of various approaches in higher education marketing, describe stakeholder groups and how to work with them as a higher education institution. The second part of this paper deals with a real case study from the Faculty of Management Science and Informatics, University of Žilina in Slovakia.

2. Literature review

2.1 Marketing of higher education institutions

Higher education marketing became more important in the 1980s alongside the increasing health care marketing [1]. Ever since then, the conditions have changed and now, the marketing activities of universities are even more important than before.

Education marketing has some similarities with social marketing and services marketing since education may be considered a service on a social level. The role of educational marketing is to ensure harmonization between the individual interests in training and learning with the collective needs of society [2].

School marketing in general can also be described as a form of purposeful communication between educational institutions offering their services (education) on one side and customers (students) and other stakeholders on the other side [7]. For the universities, it is crucial to develop their educational marketing activities based on the specific needs of their stakeholders. The interest of different stakeholder groups may differ, thus, it is important to know them well and provide the right type of marketing activity [2].

There are seven main stakeholder groups when it comes to universities and their outside environment [6]:

- Competition,
- Partners in the public sphere,
- Partners in the commercial sphere,
- Actual students,
- Absolvents and their employers,
- General public,
- High school students.

As shown in *Figure 1*, these stakeholders group all influence the inside environment of the university from the outside and each one is important.

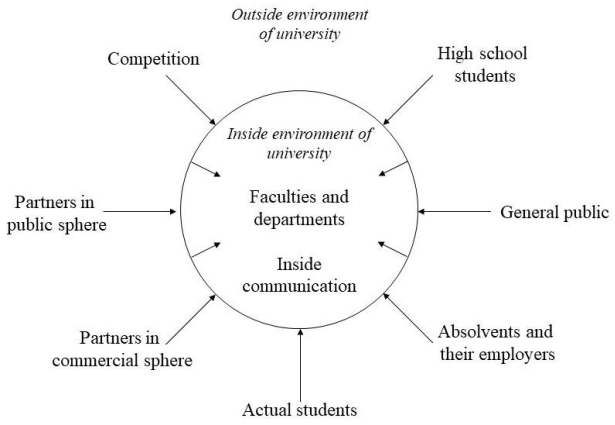

Figure 1: Stakeholder groups of a university
Source: [6]

But when it comes to marketing activities, the last group may be one of the most important, since high school students are potential future students at university, therefore potential future customers [6]. Universities must build relationships with future students even before they enrol for their studies. One of the possible ways to build a stronger relationship is to choose the right marketing methods connected with the right communication. Educational services are becoming a commercialized product that can be influenced by the consumers (in this case, potential and actual students) [3]. Thus, the relationship ought to be clear and concise.

In the 21st century, a significant part of the marketing of higher education slowly moved into the online environment since it provided an opportunity for two-way communication between universities and potential students [3].

Nowadays, it is needed to be innovative even in higher education marketing activities. This means introducing new methods supporting the promotion of education as a service by carefully choosing and targeting certain stakeholder groups [7].

The main factors influencing the students' decision that can be implemented in university marketing are [4]:

- Brand of the institution,
- Quality and relevance of the offered courses
- The reputation of the involved educators,
- Physical facilities,
- Staff profiles and their publications.

The professionalisms of teachers and educators may play a main role in students' satisfaction in higher education organizations [2].

High-quality universities and faculties are a product of good management and are not afraid to change certain stereotypes [5]. Thus, these institutions should pay greater attention to various marketing activities, especially online [5].

Bringing new online activities into marketing communication of higher education institutions is needed mainly during the times of the Covid-19 pandemic. Most of the prepared events had to be moved into the online environment and the universities had the need to be even more innovative.

2.2 Usage of business simulation games in education

Reality simulation games are a good example of non-formal education practices particularly suited for providing a structured environment for learning complex problems. Thus, this kind of education is suitable for those topics and courses that are strongly connected to the practice, just like management. When playing business simulation games, the students learn from [8]:

- The contextual information of the game,
- The process of playing,
- Risk-taking,
- Weighing up the benefits, costs, outcomes,
- Decision making.

Most of the time, students find this kind of activity enjoyable, considering it a great interactive and learning experience. In business simulation games, fun and learning are connected [8].

In the context of management training, business simulation games are one of the most effective tools for motivating and engaging players actively in the learning experience. The decision-making process is more interactive and playful. Such activities are suitable for participants of different backgrounds and skills. The advantages of using business simulation games in the educational process are [10]:

- Greater learning experience,
- A useful, interesting, and rewarding experience,
- A range of skills and competencies (teamwork, leadership…) are developed,
- Critical thinking and problem-solving are enhanced,
- The decisiveness of students increases,
- Career readiness is enhanced,
- Entrepreneurial behaviours among students are developed.

Implementing business simulation games into education has increased popularity in the last years. The learning experience is strengthened when using such non-formal educational activities. After playing business simulations in the educational process, students may experience a higher level of motivation, enjoyment and they may feel an increase in their skills [9].

3. Methods

To cover the theoretical background of this paper, literature research has been done at the databases *Scopus, Web of Science, ScienceDirect* and *ResearchGate.* The preferred sources were papers covering topics of *higher education marketing, business simulations* and *business simulations in the education process.*

The results were obtained by personally preparing and attending the covered *Online school of management and IT skills* by the authors as the lecturers. All the important information about this event is described in the Results part, alongside the results of the survey from the event. This was taken the last day of the first two week-courses and shows a satisfaction rate of students participating in this marketing event. The answers to the survey were analysed, and the authors chose the most important and significant ones.

4. Results

Due to the Covid-19 pandemic, a lot of prepared marketing activities at the Faculty of Management Science and Informatics needed to be either postponed or, which is the more useful and better case, transitioned into the online version. One of such activities was a school of management and IT skills intended for high schoolers, potential future students. It was supposed to be an event where students from all over Slovakia would come to the University of Žilina, have lectures, meet each other, meet teachers, and get answers to the questions about studies possibilities. As everything has moved into the online environment, such has this prepared activity.

Online school of management and IT skills caught the interest of many students, thus it needed to be distributed into four weekly courses. In each of the courses, the lectures took part every weekday from 3 pm to 6 pm (after students' daily school ended). Every day was differentiated into two parts – a theoretical lecture and a practical seminar. Each day held a different topic to achieve the diversity of the whole education activity. The topics and tasks of each day's lecture can be seen in *Table 1*.

Table 1 Topics of the lectures of the online school

Day	*Topic and tasks of the lecture*
Monday	Basics and principles of management and teamwork, needed definitions and concepts
Tuesday	Business games and simulations, their use in business and education
Wednesday	Mind maps and presentations, how to prepare, how to be a successful presenter, what software and technologies can be used during preparation
Thursday	Negotiation and its techniques, roles in the team during negotiation, basic principles, strategies, most used techniques
Friday	Advertisement in the online world and Google Ads, online marketing campaigns, search engine optimisation, pay-per-click and other methods and techniques

As each of the lectures was followed by practical seminars, their topics and tasks are described in *Table 2*.

Table 2 Topics of the practical seminars of the online school

Day	*Topic and tasks of the practical seminar*
Monday	**Communication and teamwork** Get to know each other within the group by short telephone or videoconference calls one-on-one, In the teams of five get the solution to a logical management game named 'Obelisk Zin', Train memory, teamwork, logical and technical analysing, Rate their own decision-making process by analysing the quality of communication in the team.
Tuesday	**Business simulation "Flower town"** Draw down a plan of a town in the business game named 'Flower town', at first, individually, later in the teams of five, Present the designs and justify the choice of placing certain objects into the town map, Give constructive feedback on the designs of other teams.
Wednesday	**Practical creating of mind map and presentation on a chosen topic** Prepare a mind map on a chosen product in pairs, Prepare a presentation about the same product, presenting the mind map with the creative processes.
Thursday	**Business simulation "Land puzzle" based on negotiation** Work in teams of three or four, Prepare documents and strategies for the negotiation in the business simulation game 'Land puzzle', Using the strategy *win-win* in the simulated negotiation find a common solution for the puzzle.
Friday	**Feedback and final survey.** Fill in the survey, time for Q&As.

To achieve maximum efficiency of lectures and seminars, the following attributes needed to be observed:

- The lectures were led by teachers, PhD candidates, students with practical experience and practitioners,
- The seminars were strongly connected to the topics from lectures,
- In the seminars, the participants were divided into groups of 15 people maximum,
- The participating students were equal partners in the whole education process with the lecturers,
- A friendly environment at the seminars was achieved mostly by the fact, that most of the lecturers were students and PhD candidates,
- All the lecturers had undergone deep simulations and training before the online school even started,
- The simulations and business games had been carefully chosen before the event,
- The lecturers were not directly involved in the decision-making processes of the participants during the games,
- When playing the games, the students were working in smaller teams within the groups.

The online school seems to be most popular with students coming from secondary vocational and technical schools (58,33% of participants), grammar schools (25%) and a smaller percentage of participants were students from business academies (10,84%) and private schools (5,83%). The data can be seen in *Figure 2*. It can be said that this type of marketing activity is the most suitable for technically oriented students, who approved to have learnt a lot of new things they had not learnt before.

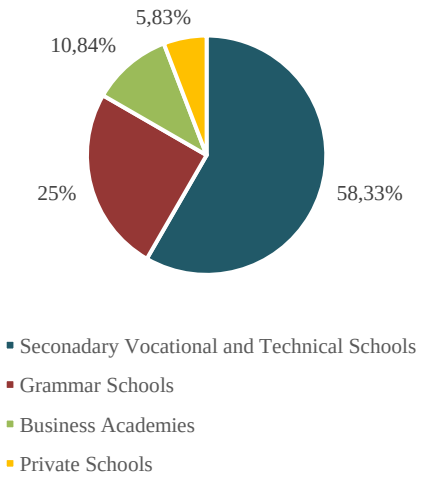

Figure 2: Distribution of participating students based on the type of their high school

During the last day's seminar, the participating students anonymously filled a survey answering questions about their satisfaction with the whole event. The ideas for some improvements were welcomed and later considered. The most important outcomes from the survey are:

- A high rate of satisfaction with the lecturers and chosen communication between students and teachers,
- Students appreciated the way and methods of education,
- Students agreed they gained a lot of new skills, thus the appreciated the topics of the lectures and seminars,
- Students liked linking theory with practice,
- Students perceived a high professional level of the institution,
- The online school helped many students in their decision making about the studies at the university,
- Many students commented that after the online school they are convinced to study at the Faculty of Management Science and Informatics.

From all the surveys (up till this date, two of four courses have happened) it is confident to say that the students are contented with the whole week activities and they would recommend such event to their friends.

5. Conclusion

Due to a big number of higher education institutions offering various educational services, there is immense competition rising. The management of higher education institutions is aware of the importance of new and innovative forms of marketing communication and of building relationships with stakeholders, mainly potential students. This paper described one of the highly effective forms of communication with high school students and a fun, playful way to engage students and possibly influence their choice of university/faculty.

It is clear from the feedback that the participating students were truly enthusiastic and contented with the form and methods used in this online event and they would recommend it to their peers. The chosen form of non-formal education together with the right choice of the topics of the lectures and the seminars proves to be a profoundly effective tool in marketing communication and relationship building. It also provides a significant competitive advantage of the higher education institution on the market with educational services.

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CURRENT STATE IN HIGHER EDUCATION MANAGEMENT THEORIES

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Abstract: *This paper brings theoretical research on current approaches in management theories of higher education institutions (HEI), mainly universities. The term 'higher education institution' is defined with its functions and principles, roles in such management, responsibilities, jurisdictions in universities. This paper also defines the main differences between university and business management. It shows current models and structures of university management, their main attributes, and differences. In this paper, it is also pointed to the influence of higher education institutions on society. The discussed theoretical knowledge is mainly based on European conditions. Views and ideas of various authors are presented, as well as an analysis of the most common practice management approaches at higher education institutions. The authors of this paper also contributed with their own attitudes and findings on this topic.*

Keywords: *management, higher education, university, HEI, management theories*

1. Introduction

Management of education institutions, their importance and function in society have been discussed more and more since education institutions have a great impact and influence on society. Education institutions and their administration changed in a significant way in the post-war and post-revolution period. Schools have become more self-governmental, and they have started to manage the processes in their own way. This is the reason why various approaches to this issue exist in the management theories.

2. Theoretical background

2.1 Educational institution

Current theoretical background and research introduce two main views at educational institutions: as a social organisation and as a bureaucratic organisation.

Educational institution as a social organisation

Educational institutions have a certain social function in society and a huge social impact on its development and progress. In this case, it is not possible, nor right, for these institutions to be reserved from the external factors. On the contrary, it is crucial for them to cooperate with other subjects in order to achieve better outcomes and a bigger and more positive impact on society.

There are five key concepts that manage the function and existence of the school as a social system [2]:

- Interaction – a school system is integrated with the elements inside and outside itself. It can not operate in the 'vacuum',
- Correlation – between the educational system and politics, economy, culture and technologies, there exists a correlation,
- Interdependence – the strength of social, economic, juridical, and political environment is a function of educational institution survival,
- Culture entity – as a social institution focused on social development, an educational institution has its own values, customs, and practices,
- Inside structure – an educational institution is formed such way, that allows formal and non-formal structures, communication channels, and a relationship authority – subordinate.

Educational institution as a bureaucratic organisation

Educational institutions have strictly given functions, responsibilities and duties and they need to be organised according to a fixed structure, hierarchy, and other attributes. German sociologist Max Weber gave couple principles of bureaucratic management model. These principles can help with the right understanding of educational institution as a bureaucratic organisation [2]:

- Division of labour – one of the key principles. It is based on functioning specialisation, giving exact and clear description of duties and the division of responsibilities for each position or office. Behaviour, a way of producing/offering services and the relationships inside the organisation are defined and regulated,
- Hierarchy of the authorities – organisation and arrangement of certain divisions, where each lower division is under control and sight of the upper one. There exist a superiority and subordination,
- Impersonality – the manager of the division is impersonal and impartial during the official negotiations and discussions. Particularisation and personal interests are not recommended,
- Documentation – all events and activities must be recorded, and the officials must follow the rules, regulations, and procedures.

2.2 Management of educational institutions

There is no big difference between a management of educational institutions and the classical management.

Even in the management of educational institutions there need to be all the managerial functions (planning, organising, people management and staffing, controlling). On the other hand, the targets and their achieving should not only be focused on the profit but more important should be upper academic aims.

Educating individuals, organisations, nations, and societies gives an advantage in life and working conditions. Administration of such complex and important process gains its meaning and represents a scientific discipline named management in education. This means managing work of the educational institution, managing education and professional training of employees in the society but also managing processes, projects, or activities in the educational environment. A quality purposeful work, planning and educating can contribute to the higher effectivity – better results of the students get the society on a higher level [3].

Bush arguments that the management in education should centrally focus on a purpose or targets of education. These purposes and targets give a crucial meaning for the direction which the educational institution should be managed by. Management is focused on certain educational targets. If the connection between the purpose and the administration is not clear and concise, there is a danger of 'managerialism' – focusing on practices at the expense of educational goals and values [5].

2.3 Levels of management of educational institutions

The environment of educational institutions is more dynamic than it may appear. It is visible mostly in the case of higher education. The levels of management are like those in the private or the public sphere – the top management, the middle level management, and the lowest management.

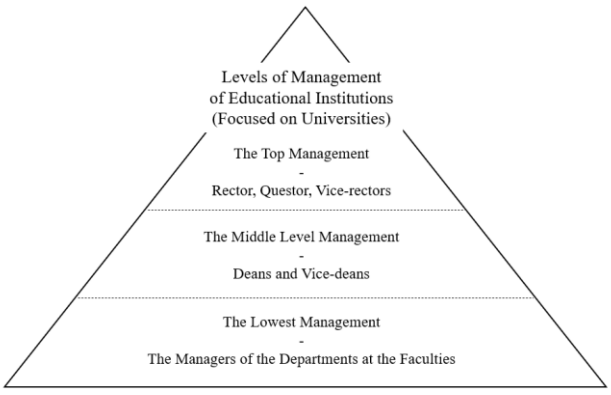

Figure 1- Levels of management of educational institutions (focused on universities)
Source: the author

Figure 1 shows the management levels of educational institutions (in this case, the universities). The universities in Slovakia are divided into three basic levels:

- The top management – rector, questor, and individual vice-rectors,
- The middle level management – the management of individual faculties, deans, vice-deans, and faculty secretaries,
- The lowest management – the managers of the departments at the faculties.

The top management of the educational institution consists of rectors, questors, and vice-rectors of the institution. The top management determines the strategy for the following development of the educational institution. Its responsibilities and tasks are [21]:

- The analysis, the evaluation and dealing with the external influences of the university,
- Setting long-term strategies, educational aims, and educational politics of the institution, including dividing the main budget and allocating the sources at the university,
- Creating the organisational frame that should consist of individual relationships and determination of liabilities,
- The appointment of departmental managers and other key employees,
- Ensuring the overall management of the educational organization.

The middle level management of the educational institution consists of deans, vice-deans, and secretaries of individual faculties. These employees act as a whole on a tactical level. Their tasks and responsibilities are [21]:

- Interpreting, explaining, and monitoring of the implementation of politics formed by the top management,
- Setting and issuing instructions concerning individual operations,
- Overseeing the fulfilment of goals, controlling of the outcomes, and evaluating the performance,
- Decision making at the level of the faculty,
- Managing and coordinating various parts of the faculty (the departments),
- Being a connective element between the top and the lowest management of educational institution,

The lowest management of the educational institution consists of the employees managing the departments. They are chosen either by the middle level management, or by the employees of the very department. This is the operative level, and its responsibilities and tasks are [21]:

- Planning of everyday activities within the objectives set by upper management levels,
- Job allocation to employees and division of labour,
- Supervising and controlling the employees,
- Supervising the maintenance of individual classrooms, laboratories, and equipment,
- Advising and helping the employees (explaining the work procedures, problem solving, etc.).

2.4 Current models and structures of university management

There are several models of university governance in the literature (mainly in the United Kingdom). Different structures reflect the different needs of different universities, which use them for their management. The basic 6 most important models of the management structure of educational institutions may include, for example [23]:

- A bureaucratic model,
- A managerial model,
- A collegial model,
- A model of political organisation,
- A discipline-based regime,
- An organised anarchy.

The individual models and structures of possible approaches in the management of colleges and universities are briefly and clearly arranged and described in *Table 1*. This table contains the most important features from each selected model and structure. The table is an analysis and search of various sources and publications from several authors who deal with the issue of management of educational institutions.

Table 1 - Models and structures of possible approaches in the management of colleges and universities

Management model	*Main characteristics*
A bureaucratic model	Paper-based and regulated controls, clear lines of responsibilities, a structured hierarchy, possible negative impact on education.
A managerial model	Based on the management, focused on the effectivity and economics, compliance with the standards of the administration, delegation of powers on the management of the institution.
A collegial model	The management is under the academical control, the emphasis on education, academical autonomy.
A model of political organisation	Negotiations and discussions on lower levels of the hierarchy with the target of achieving the consensus. Ratification by upper management, the top management holds the decision.
A discipline-based regime	High importance for research and teaching, focusing on more scientific activities, more traditional university management, avoiding business and managerial tendencies, striving for quality and excellence.
An organised anarchy	Management should be excluded from the inflexible structures of the organization, it should contain autonomous and ambiguous characteristics in the structure and power, the functioning of departments without controlled restrictions.

Sources: [1] [4] [6] [7] [8] [9] [10] [11] [12] [13] [14] [15] [16] [17] [18] [19] [20] [22] [23]

It is clear from the table that the described models differ from each other in the approach into the managing the educational institution, the form of education and other important activities. There are six most used models described, even though there are more of them globally, most of them differ significantly considering different cultures.

3. Conclusion

The management system of educational institutions as well as the very perception of the importance and social impact of educational institutions on society is diametrically different regarding individual countries and their cultural customs, which forms a globally differentiated system that cannot be combined into one common system with the same rules, structures, and models, according to which individual universities and colleges around the world should be governed uniformly. However, it is important that each educational institution adapts its way of leading and managing to the legislative requirements and then chooses the way and model that best suits the achievement of the goals that the educational institution sets. The article summarized the most common models, approaches to governance and the division of power, responsibilities, and powers within educational institutions, focusing primarily on Europe.

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LOCAL GOVERNMENTS AND THEIR ROLE IN PANDEMICS

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Abstract: *Local governments including villages, towns, cities, districts or even regions represent a very important governmental unit in the state. People live there, work, spend their time in the environment of the local governments. The pandemic of the Covid-19 has significantly affected the management and operations of local governments and the importance of these units was shown as even greater. The aim of this paper is to analyse why it is so and what factors may influence the importance of the local governments. Views of various authors are discussed in topics like local authorities and their responsibilities, trust, and communication on the governmental level and even the challenges for the governments when fighting with a pandemic. This paper also brings the recommendations connected to strategic planning and its use in current and future situations. This paper also discusses the importance of the local governments in the post-pandemic era and how important is the prevention of a similar crisis or pandemic. Discussed authors point to the usage of smart solutions and technologies at the local-governmental level in order to achieve the highest possible level of safety and prevention.*

Keywords: *Local government, Public administration, Crisis management, Strategic management, Pandemic crisis.*

1. Introduction

At the beginning of the year 2020, the world came into one of the biggest crises of modern world, a global pandemic of the coronavirus disease, also known as Covid-19. The governments of countries all over the world took decisions to stop spreading the virus. Especially in Slovakia, a lot of responsibilities and decisions were delegated on local governments, meaning mayors needed to take care of elderly people even more, provide undisturbed operation of all processes at the municipal offices and in the autumn, even provide blanket testing in the villages and towns.

This article deals with the problematics of the essential role of local governments when it comes to a crisis just like the Covid-19 case. The aim of this paper is to describe a current theoretical background of the importance of local governments in general, their role in communication with the citizens and show some of the most important issues that local governments will need to handle after the crisis. The paper also gives a summarisation of the most essential information and issues the local governments should prepare for with recommendations to operating them smoothly.

2. Literature review

2.1 The importance of local governments

Local governments play essential role in COVID-19 response [5]. That is due to three basic reasons. Firstly, local governments are more connected to public and can easier navigate specific local conditions. Secondly, local authorities are more accessible to the public and thus they can be more responsive to the public needs. The third reason is perceived legitimacy to carry out state functions. Citizens are more engaged and have bigger trust in local authorities than in more distant bureaucrats. Local governments never have been so important, and they had to show very quick reactions to upcoming challenges [5]. Cities and local government areas have a vital role in implementing anti-contagion policies and adjusting measures to local conditions. [2]

COVID-19 is not just a health issue, but a complex reality with physical environment, socio-economic and identity factors contributing to the vulnerability of communities to the virus [1]. Local governmental challenges related to the three phases of the Covid-19 pandemic are written in Table 1 [10].

Table 1 Phases and challenges of pandemic

Covid-19 pandemic phase	*Governmental challenges*
1: Acute disruption and emergency response. (Lockdown period)	▪ Lowering the number of infections. ▪ Flattening the curve. ▪ Protecting health systems. ▪ Ensuring basic needs and essential public services.
2: Prolonged disruption and dilemmas of adjustment. (Post-lockdown (pre-vaccine) period)	▪ Managing the pandemic at acceptable level for health systems. ▪ Limiting the impact on economics. (unemployment, doubts…) ▪ Limiting the social impacts caused by lockdowns.
3: Transitioning to a 'new normal'. (Post-vaccine period)	▪ Preparing for a slow process after easing the lockdowns. ▪ Learning from the Covid-19 pandemic. ▪ Getting used to a new normal. ▪ Anticipating future problems and preparing for them.

Source: [10]

2.2 Trust and communication

One of the key elements of effective usage of information during crisis is gaining trust towards government (local and national) by effectively mobilising advice and information. [1] Trust in government is essential while

coping with crisis situations [13]. It applies also on online media since they have become common communication channel between governments and citizens.

Social media is identified as a useful tool for local governments when communicating important issues on a more frequent, open, and targeted level [6]. Local authorities can use social media also for very fast disaster response, giving the information out in a real-time [6]. This makes social media an important source of information for the public during a crisis when used precisely by governments (local and national). During a crisis, the usage of social media increases, and people share information more often. [6] The interest in social media increased even more during the pandemic of COVID-19 [11]. This happened because of the broad lockdowns, travel restrictions, social distancing and closing businesses all over the world. National and local governments found the effect of communicating via social media and provided quick information to the citizens.

Social media still need to be used wisely, even in crisis communication. It is advised for the governments to comprehensively use technologies to analyse public demands and their change during crisis [3]. This can later reflect on satisfying the needs of citizens and giving them the most needed information. The active dialogue should be encouraged by responding to citizens' messages and questions. Posts with negative emotions (or very formal) should consist of plan text, on contrary, posts displaying positive emotions (or slightly unformal) can include videos or pictures [3]

2.3 Local authorities and management

Mayors are described as the most representative and important figures of local governance [4]. Not only they are responsible for overall running of the municipality but also for public duties as urban planning, economic development, waste management and so on. Garavaglia [4] stated out the importance of leadership during crisis and pointed to sharing information between various municipalities and mayors as an essential element in crisis management. There is a need for cooperation between local governments, mostly in coordinating and harmonizing activities when it comes to health facilities [9].

Representatives' leadership is truly important in local governments in terms of public trust and maintaining the quality of health services provided to citizens [7].

There is a significant importance of governance factors as institutional capacities or legitimacy in the COVID-19 pandemic fight alongside with biologic, demographic, or economic factors [5]. One of the fundamental keys for local governments' effectiveness is long-term support [5]. Thus, the cooperation between state and local governments is essential. The urgent need for quick decisions can lead to new collaborations between various local governments and evolve into new crisis management models.

During pandemic crisis, coordinating activities is most effective in top-down management through multi-level governance systems in state [12]. Yet, strong leadership in local governments is needed to take fast actions. For example, during the first phases of pandemic, a lot of local governments in Australia took initiatives and tried to lower the effects of coronavirus spreading [12]. This way, the most effective model of government management turned out to be a combination of top-down and bottom-up activities. It is described to be a result of two main factors. First being the trust in government and its initiatives, the other one is having mechanisms of engaging citizens in the initiatives. In governmental management, long-term development visions and emergency plans are helpful, too, alongside with strong inter-local governance relationships.

2.4 Strategic planning in local governments during crisis

Right set of strategic planning in local governments is essential when preparing for crisis. Many local government units underestimate strategic crisis planning. It is certainly a part of management that should not be undermined. With right strategic plans, the responses to crisis situations are more likely to be effective. OECD described four key pillars for governments when responding to a new pandemic [8]:

1. Surveillance and detection.
2. Clinical management of cases.
3. Prevention of the spread in the community.
4. Maintaining essential services.

One of the biggest challenges during a pandemic and especially under lockdown is maintaining peace and order in the local government. A lot of people faced a lack of food or other basic supplies and thus they felt under pressure, uncertain and maybe unsafe. Prioritizing highly vulnerable groups of people by helping them and assisting when in need and with food and medical supplies is advised [9].

The five main steps of strategic planning for local governments when dealing with crisis of global pandemic are [9]:

1. Specifying a clear and realistic timeframe of challenges based on the evolving local conditions.
2. Responding to urgent medical concerns and providing the necessary medical supplies and facilities for health frontlines. Also, providing health and socio-economic support to the most vulnerable groups after identifying them.
3. Lowering the Covid-19 impact without affecting the movement of essential personnel, goods, and services.
4. Ensuring efficient coordination with various government agencies and non-state players by functional institutional arrangements.
5. Critically revisiting the former plans and building a recovery plan when transitioning into a post-pandemic period. [9]

There are two basic strategy groups most effective to minimise health consequences caused by pandemics. Their application and implementation are needed most in the absence of effective drugs and vaccines, such as the case of COVID-19 pre-vaccine phase [8]:

- *Containment strategies* aim to minimise the risk of transmission from infected to non-infected individuals to stop the outbreak. Here might be included the actions to detect cases early on and trace an infected individual's contacts. Quarantining affected persons might be applied.
- *Mitigation strategies* aim to slow the disease, and to reduce the peak in health care demand. In this case, policy actions are often included, such as social distancing, lockdowns, or improved and strengthened personal and environmental hygiene. [8]

The key to success is to combine the two strategy measures. OECD brought up the following techniques and suggestions based on previous epidemic outbreaks and case studies [8]:

- Workplace social distancing such as home office can be very effective delaying the disease peak, though with significant economic consequences.
- School closures can reduce transmission of the disease if the reproduction number is higher among children than adults. Yet, this is not fully applicable for COVID-19 case. School closures can also have significant economic and social consequences.
- Banning mass gatherings has a smaller effect than other techniques since the contact time is shorter than in schools or work.
- Social distancing brings a couple of challenges as reduced economic activity, social interaction or dome kinds of psychological damage, thus local governments need to take this into consideration.
- One of the most effective measures to reduce rates in the community is household quarantine.
- For a balance between preventing panic and encouraging action, effective communication is crucial.
- The risk of getting infected is reduced with personal hygiene measures.

2.5 Issues and challenges for local governments

Taking place in the Lombardy region, the first and most affected region by Covid-19 in Europe, the four key issues when fighting the pandemic were described in the research [4]:

- the importance of adaptive leadership style and of anticipatory governance frameworks aimed at providing direction in situations of emergency,
- the importance of promoting institutional spaces for cooperation and collaboration with citizens in their role as volunteers and of other organizational stakeholders willing to contribute to public value co-creation,
- the role of technology as an enabler and a medium for swiftly sharing information and crowdsourcing resources,
- the importance of safe and trusted platforms for knowledge sharing among the mayors and with the relevant organizational stakeholders.

Traditionally, larger cities are more likely to have fast-spreading viruses due to their high population density [7]. It is expected that by 2050, more than two thirds of the global population will be living in urban areas. Thus, to eliminate risk of various viruses spreading, the health management in urban areas and local government needs to be improved. The greatest potential in achieving effective health management is in technology usage. For more intelligent local governments, the higher usage of Internet of Things and Artificial Intelligence is advised and predicted [7]. It is predicted that in the post-COVID-19 urban areas the need for safety will increase, alongside with usage of smart solutions, intelligent technologies, or online platforms, bringing stronger social inclusion and citizen engagement [2]

Major issues and recommendations for post-COVID planning in local governments are described in Table 2 [12]:

Table 2 Issues and recommendations for post-pandemic planning

Issue	*Recommendation*
Absence of proactive planning and emergency plans as a major problem in responding to issues.	Integrating long-term visions and plans while enhancing adaptive capacity.
Fragmented and decentralised urban governance lowers response and adaptation capacities.	Providing economic and social support to vulnerable groups. Focusing on critical levels of local leadership and community engagement.
Need for a bigger number of smart solutions.	Providing access to time and geo-referenced data to public.
Using technology-driven approaches have raised concerns about privacy and transparency	When using technology-driven approaches, privacy needs to be secured. For empowering citizens, it is better to use human-driven approaches. During pandemic, combined approaches are being advised to use, in terms of privacy concerns, coordination, sharing information, controlling misinformation.

Source: [12]

For the local governments, it is essential to prepare for these issues and try to follow the recommendations. After the crisis, society will be influenced, thus a lot of things may change. The local governments should represent a trustful authority for the citizens and provide the best possible life for them.

3. Conclusion

Local governments face a lot of issues and decisions nowadays. A pandemic situation needs to be handled

carefully, responsibly, and precisely. It is important for the local governments to gain be trustful since the trust and communication with the citizens is crucial to effectively manage the crisis. The needed trust can be gained by carefully communicating the steps and plans of the government with the citizens. Social media appeared to be the right choice due to the possibility of real-time informing.

A good example on how to use social media properly and gain the trust may be the town of Žilina (Slovakia). On their official Facebook page *Mesto Žilina* the citizens can find all important information about the blanket testing, the restrictions and recommendations and they can contact the town authorities. In Žilina, it is also taken care of the citizens who are immobile, ill, elder, or even Covid-19 positive, and they cannot buy their own groceries [14].

It is not only towns that appear to have a good, trustful relationship with their citizens. In Slovakia, also a village of Chrenovec-Brusno maintains a good level of trust and communication with the citizens. Also, on the official Facebook page, people can find real-time information, data from blanket testing, reports [15], and other news can be found. The inhabitants of this village often use this media to communicate with the authorities.

In this paper, it was pointed to the big importance of local governments during a crisis. The reasons why they play such an essential role might be concluded in these points:

- Local governments are closer to the citizens, thus they act as a connecting link between the citizens and the national governments,
- They know their citizens better so they can choose the right way of communication,
- The local authorities can gain the trust of the citizens easier,
- The strategic planning on the local-governmental level is more fitted on the needs of the citizens,
- The local governments are more flexible to the changes, thus the reactions are faster.

There are still many challenges appearing every day that are connected to dealing with the coronavirus situation. Blanket testing, vaccination, a collective immunity, and a lot more Not only handling the current situation is essential. The state and the local governments need to prepare for some later challenges for the post-pandemic times. New technologies and smart solutions will be more than welcome when dealing with possible future crisis. Proactive long-term planning may also play an essential role in preparing for the crisis or even predicting it.
This paper proved the importance of local governments in a crisis just like the Covid-19 case. The described information and gained knowledge may be used by the academics or the local authorities when implementing the preparations for the possible crisis situations in the future.

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SUPPORT FOR THE SOCIAL WORKER WELL-BEING – A CHALLENGE FOR SOCIAL SERVICES

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Abstract: *The well-being of a social worker is a little-addressed topic in research and mostly understood as a psychological concept. Organizational well-being is also an opportunity for social services to better understand the support of social workers. Better care for the well-being of the worker by the organization can reduce the negative effects such as burnout, but also have a positive effect on improving the quality of services. The aim of the paper is to describe the theoretical and methodological basis for research of the well-being of a social worker within the organizational culture in social services. The results of the theoretical analysis and the proposed research model are presented.*

Keywords: *social worker well-being, social services, organizational culture, organizational well-being*

1. Introduction

Well-being as a theoretical concept can be understood from several philosophical, psychological or socio-political perspectives. Philosophy brought two concepts of well-being (WB) and human happiness - hedonic (pleasant life) and eudaimonic (meaningful life). These concepts have found their scientific follow in psychology, hedonic in the concept of subjective WB [1], which measures the level of positive emotions and self-assessment of life satisfaction, eudaimonia in the concept of psychological and social WB, which take into account issues of personal growth and self-realization at an individual and social level. 2]. Bakker [3] in subjective WB distinguishes job satisfaction as positive SWB, other forms are commitment to work and happiness at work, negative forms of SWB are then workaholism and burnout. At the socio-political level, WB is understood mainly in the context of conditions and quality of life. The objective aspects (conditions for WB), as well as the subjective perception of WB by people (subjective WB), are examined and evaluated.

WB refers to different areas of needs. According to Seligman [4] the following are essential for WB of individuals: positive emotions and relationships, meaning and purpose, engagement (flow) and achievement. It is a view of positive psychology that strives for complexity and creates a framework for flourishing a person (or thriving).

The topic of well-being gradually spread to the field of organizations after E. May's research in the 1930s.Iinterest in informal relationships in the workplace and later, in employee satisfaction came to force thanks to Herzberg's two-factor theory [5,6]. The humanization of the workplace was also supported by the humanistic theories of Rogers and Maslow [5]. The topic of employee satisfaction has grown into an interest in his overall well-being.

In the last decades of research, employee/worker well-being has become a key topic and is associated with benefits on the part of the employee and the organization, with higher productivity, motivation, engagement, satisfaction, optimism [7,8,9], lower health risks, lower turnover [7,10] and the overall effectiveness of the organization [11,12].

Building a successful organization means putting people first in the organization, [13] WB as an organizational imperative [14] means supporting the WB employee through the core of the organization, its culture, goals, values and behaviour.

This is a challenge not only for executive organizational cultures in the commercial sector but also for social services, where in the field of social work we are struggling with the crisis of the profession [15], burnout and the negative consequences of the profession [16] and at the same time striving for a higher quality of services. How can the further progress of social services and social work be ensured without more effective tools to support social workers is the question to discuss. One of the possibilities shown by previous research in the field of organizational psychology and management is to support the WB social worker through the organisational culture.

1.1 Organizational culture and worker´ well-being

Feeling good at work is a value from which benefits both the individual and the organization [17]. According to Torri, Toniolo [18], organizational well-being (OWB) can be defined as the ability of an organization to increase and maintain the physical, psychological and social well-being of workers at all levels and for every job. From the focus on the physical and mental WB of workers (wellness), the interest moves to other areas in which the worker can prosper (well-being) [18]. The organization can create conditions for several areas of WB employees - physical, mental (emotional), social, spiritual, environmental, intellectual, occupational, financial, etc. [18, 19].

Albrecht [13] recommends incorporating employee well-being into organizational policy and ethics, taking into

account the entire employee (his overall WB), organizing the organization's goals and culture in one line, auditing their own culture and letting leaders transform culture of the organisation to the culture of well-being). The culture of well-being here represents a type of organizational culture, which with its goals, values and norms aims to support and increase the well-being of employees and people in the organization in various dimensions.

1.2 Social services and social worker well-being

Social services have undergone significant changes in recent decades at the level of organizational culture (OC). Charitable and medical (paternalistic) models are gradually being humanized and the current OC model can be described as the human rights model., a "service model" that respects the rights and autonomy of the client. A social worker (SW) is a partner in the process who uses his professional and personal qualities and accompanies the client on the path to his self-sufficiency and better quality of life [20].

The client's well-being is the primary value in the current model of services, the service created for this purpose is naturally oriented towards him. However, organizations in the social services sector must also keep in mind the WB of workers, who cannot be neglected. Willis, Molina [21] argue that the client should not be more important as a worker. Self-care should be enshrined in a code of ethics, which is not reactive (solutions to burns and problems) but proactive, including proactive care for the area: physical, emotional, intellectual, social, professional, spiritual and environmental.

Research also shows that workers in more demanding positions neglect self-care [22, 16]. NASW states that its mission is to advance, protect and defend social workers and the social work profession: "we care deeply about the health and well-being of all social workers" [23]. It recommends SW to improve its own wellness, such as physical, mental or social dimensions in terms of better self-care, which it also sees in favour of well-being in clients.

Researchers in the field of quality of social services warn us that without adequate support of the employee and his satisfaction, we cannot expect long-term progress in the field of service quality [24,25]. The implementation of quality standards also brings with it risks in the form of moral dilemmas that arise in the conflict of efforts to comply with prescribed procedures vs. building a relationship with the client. The culture of providing social services thus emerges as a "product of a steady and individually acceptable circumvention of the dilemma of working with clients in the organization" [26].

Efforts to build a new culture in the SS should not go in that direction. On the contrary, it is necessary to find a way that will continue to support the individual well-being of the client and the well-being of people, as stated by the social work mission [27] This goal can be accomplished precisely through the culture of the organization, primarily by anchoring well-being at the core of the organizations that provide services. A well-being culture in social services can be reached, as long as the vision, goals and organizational values include the well-being of the worker. Good practice examples [28,29] show us how to formulate a vision, goals, values to explicit that the needs and support of employees are important. Through this "mental programming" [30] we can change patterns of behaviour as part of a new culture.

The American association AVMA named two approaches for its organization describing the approach to the well-being of the client and the employee: client-focused and member-centric [31]. These approaches of looking at the WB, which can be transferred to the field of social services. Social workers are direct actors in the processes with the client and their well-being (especially in residential services) is closely connected with WB of clients. Building the well-being of people in an organization means focusing on everyone, especially those who provide WB to clients. Organizational WB can be supported at the system level (culture) and individual (self-care).

Well-being programs that various agencies create for their own or other organizations provide theoretical and practical models that can be followed to build a "well-being culture" in the organization. One of the models (AVMA), together with the formulation of values, vision and goals [19, 31], was selected as a good practice example

It is also used as a theoretical model for future research design, which will be presented in this paper.

1.3 Social worker well-being in research

A theoretical analysis of the available literature on the topic was performed. The research studies that identified organizational variables in relation to the client's well-being were found The well-being of a social worker is examined mainly in terms of psychological concepts (subjective, psychological WB) or its individual aspects (engagement, wellness, job satisfaction), or as protective factors against burnout syndrome, while the results of studies show that the significant variables that may be influenced by the organization and that support the WB social worker are:

- workplace interpersonal relationships, decision-making processes, quality and nature of management-employee interactions, workplace expectations of the worker [32],
- social support, degree of responsibility for others, job security, amount of work and the border between home and work [33],
- supervision and cooperation, reflective practice and mutual assistance within the profession, professional development and further training, teamwork and the

possibility of triangulation of services, the cohesion of values of personal and professional life [34],
- job satisfaction, capacity development, work-life balance, organizational support, emotional support of the supervisor [35],
- support for co-workers in an interview or in team-work, supervision as a source of support, hearings, to persevere in hard work [36],
- social support of colleagues and superiors [37], support of supervisor and team [38] protective factors against stress and burnout syndrome,
- good relations with colleagues and superiors, recognition /appreciation of the work done, promotion and personal development, salary, lack of stress at the workplace, supervision as some of the determinants of job satisfaction [39].

The organizational WB of a social worker is not the subject of research in current studies. Self-care studies, which are close to this topic, take into account a holistic multi-dimensional model [21], with some authors arguing that the self-care model should be supported by an organization that has to: create conditions at the level of management and functioning of the organization; to create psychologically healthy workplaces, to provide education, supervision and well-being [40].

Bates, Thompson [41] suggest that solutions for well-being in the workplace should not only be individualized or medicalised (health interventions, but should also be addressed systemically, through occupational social work that involves: advocacy, mediation, brokerage (connecting people with sources), problem solving-strategies, education. Here, however, the authors consider the area of organizations outside social services, but who will address social workers who are supposed to take care of others and themselves at the same time?

The culture of the organization and its influence is a systemic solution for the well-being of employees and it can also be a solution for the area of social services. The concept of “culture of well-being” and examples of good practice in the field of social services or other helping professions provide a theoretical framework that also provides an incentive for modelling culture in social services. Building a culture of well-being in the social services area presupposes: auditing the existing OC in social services (where they are now), focusing on goals and values as pillars of OC (as formulated in favour of client and employee well-being). Followingly, the experiences and attitudes of the actors in the organization who form the OC in social services need to be found out, social workers to the systemic (organizational) support of their well-being and also the attitudes of management to the support of the well-being of workers. We propose a methodological framework for this issue.

2. Research methods

Organizational culture speaks of "how things are done in our organisation", it is a system of shared beliefs, values and norms that are reflected in our behaviour and actions in everyday situations [42]. The analysis of the elements of OC in social care homes can point to the real state of support for the well-being of social workers and serve as a starting point for further research and opportunities to influence the organizational culture in the area of social services towards the well-being of the client and worker at the same time.

According to Strauss and Corbin, it is appropriate to use qualitative research in those cases where we try to reveal the essence of someone's experience with a certain phenomenon [43]. A qualitative strategy that allows to explore the new topic in more depth and obtain more detailed data and context as a basis for future research or theory is proposed.

2.1 Objectives

The aim of the research is:

- to identify specific elements within the culture of the organization as factors supporting the well-being of social workers in social care homes.

Sub-objectives of the research are as follows:

- identify the specific content of culture (activities, customs) based on the experience of social workers with organizational culture,
- find out how the different dimensions of the organizational WB are saturated by the organization,
- analyze and interpret the attitudes of social workers to the current state of support for their well-being,
- find out how the support of social workers is formulated in the documents describing the OC (vision, mission, goals, values).

Mental and behavioural patterns in OC in the context of the well-being of the workers in social care homes will be examined. According to Schein [44], the core of culture is value, which is reflected in goals, vision and, ultimately, in cultural norms and patterns of behaviour. Examining the experience of social workers and through the analysis of selected documents, the elements of OC, which are, at the same time, elements (factors) of support for WB social workers will be identified.

The research question is: What elements of support for the well-being of social workers are part of the culture of the organization in social care homes from the point of view of social workers and key documents?

2.2 Data collection and analysis

The theoretical framework of organizational WB, the nine-dimensional model AVMA [19] is chosen by the authors of this paper. This model presents nine areas of WB support to employees at the individual and organizational level. Four areas of WB (physical, emotional, social, spiritual) and the fifth area - professional WB is chosen. Thus, thematic areas, defined by AVMA and professional

standards of social work, were obtained. The aim is to find out how these areas of WB are saturated in the organization, within the behaviour and its formal assumptions (vision, goals, values).

The following methods of data collection and analysis are used:

1. *Semi-structured interview* - with social workers in social care homes. The research sample was obtained by the snowball technique. Convenience sampling according to Monet et al [19] meets the requirement of theoretical saturation and proportional representation of public and private social care homes. The interviews are transcribed and analyzed by the method of thematic analysis (TA), which is a method of content analysis that is suitable for obtaining qualitative information about a person, situation, group, organization or culture. Braun, Clarke proposed a procedure of thematic analysis in six steps, resulting in a thematic model [45]. Topics can be revealed in the process of inductive coding or deductively using the literature or based on the experience of the researcher [46], as in case of this paper.

From the interviews, the categories that correspond to the individual areas of WB, selected by the authors of this paper, will be determined:

2. *Content analysis* - texts relevant for the analysis are goals, vision, values in the organization and annual reports. These texts can be obtained on request or are available on websites of social care homes. Using the methods of qualitative content analysis [47] the elements of support of selected areas of WB and its formulation in goals and values and its implementation (according to annual reports) is found out.

3. To ensure the credibility of the research, *the triangulation* of methods is implemented- two questions about the support of WB employees are asked to the manager of the facility. His view will complement the data obtained from the interview and content analysis of documents.

2.3 Limitations and strengths

The limit of the research is the current epidemiological situation, which complicates the possibility of obtaining respondents and documents for the content analysis. In qualitative research, it is challenging to prove validity and reliability, but it can be ensured by the detailed description of procedures, direct citations of interviewed persons and triangulation of methods, as the authors of this paper do. According to Švaříček, Šeďová [48], two researchers can record different results of the analysis of the same text, discover new aspects and topics. It may not be a shortcoming, but the advantage of qualitative research.
The strength of the research is direct contact with respondents, capturing all aspects of communication, including non-verbal ones. A higher number of respondents allow the authors to find other topics and categories. On the contrary, a lower number will allow the authors to penetrate more into the depth of the context.

3. Conclusion

Finding various tools to support the WB of social workers is a current topic for research, based on the needs of the practice. Social services striving for a higher quality of services cannot achieve the desired benefits for the client unless an adequate system of support for social workers is established at the professional and personal level. The needs of a social worker, understood holistically, promote the self-care model and researchers recommend supporting it within the codes of social work, education and in the preparation of organizational conditions. One of the ways to effectively support an employee is to reform the organizational culture. By transforming goals and values, which also take into account the needs of the social worker, organisational culture in social services will be modelled a real "culture of well-being". This will meet the needs of the ethics and effectiveness of social work - the well-being of the individual and people as a whole.
Changes in the organisational culture at the level of goals and behaviour can be achieved through managerial procedures [42], but the admission of this change by employees is inevitable. A significant element of proposing well-being in an organisation is supervision, which helps students and staff develop an awareness of well-being and support its implementation. The existing models of well-being [19], which can be validated or designed by research, are an example of the practice. Further research in this area is proposed.

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UNDERSTANDING THE THEORETICAL FOUNDATIONS OF CIO IMPACT ON ORNGANISTIONAL EFFECTIVENESS: PRIOR AND PLANED RESEARCH

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Abstract: *This research-in-progress paper describes the intended theoretical and structural framework of a doctoral thesis exploring the antecedents and consequences of Chief Information Officer (CIO) effectiveness. The Scope of this paper is to outline the theoretical foundations of available research on CIO effectiveness, to identify additional relevant theories and to define the proposed research process and structure of the dissertation. Purpose: The result of this research paper will be the bases of the development of the Structured Equation Model (SEM) and an online survey. Methodology: Structured literature analysis to investigate which management science theories have been used in prior publications from scholars in the area CIO effectiveness research. Results: This paper gives an overview over the planed research project, the theories used and the structure of the thesis.*

Keywords: *Chief Information Officer, Principal Agent Model, Upper Echelon Theory, Rewards Theory, organizational performance*

Introduction and actuality of the topic

Synnott defined 1981 the role of the chief information officer (CIO) as the "senior executive responsible for establishing corporate information policy, standards, and management control over all corporate information resources" [1].

CIOs can positively influence the company performance not only by fostering the IT efficiency, which means lowering cost and by this increase the profit, yet increase the IT effectivity through improved IT use [2].

Measures to drive IT efficiency are introducing tailored internal IT management systems [3] efficient IT service management (ITSM) frameworks [4] and the right organizational setup [5]. An efficient budgeting and controlling process which ensures that investments in technology deliver the planned results [6] is essential. Measures to improve IT effectivity are supporting business processes with appropriate information technology [7].

But ultimately a CIOs main task is to ensure "Business-IT-Alignment" (BITA). This results in strategic information technology initiatives driving business performance [8].

Information Technology departments act as internal supplying organizations. The "Human Resource" theory describes the desire of initiative, responsibility and creativity of the workers and the importance of information sharing and teamwork [9]. These preconditions create the room for innovations which are the driver for organizational and financial success.

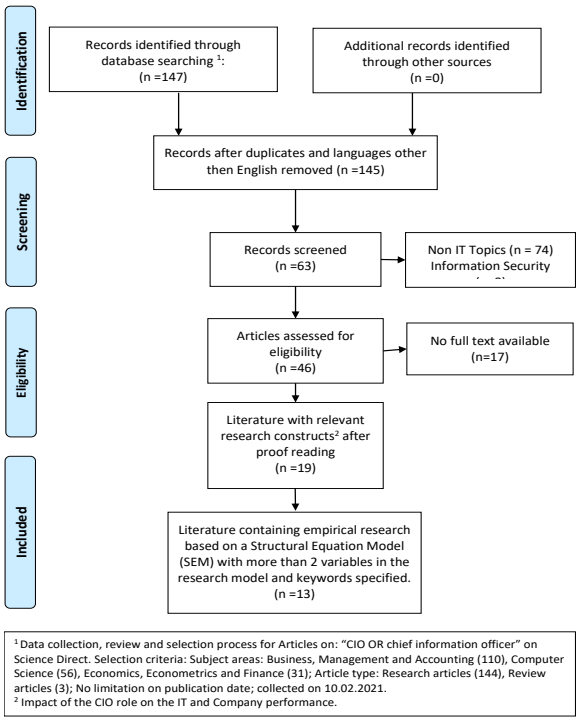
According to J. A. Schumpeter the economic system needs to go through mutation and revolution to keep capitalism running [10]. Innovation is one mean for this mutation and revolution. IT Organizations act accordingly and change technologies and promote changes in their own operations and processes and through their service offerings also at their internal customers.

1. Literature review

The topic of IT Management and CIO effectiveness has been researched from different angles in the past decades. Even so, the amount of research is limited. Only few publication bases on quantitative research methods of the complex relationships and influence factors in this management area. Many researchers in the field of business informatics use qualitative research methods.

The aim of the literature selection was to find only publications which were based on quantitative research utilizing a structural equation model. All other publications have not been considered. The process of literature selection was executed as described in Figure 1 based on the Science Direct database.

Selected publications have been further reviewed for the mentioning of specific management theories used for empirical research. By this, the number of publications was further reduced to n=11. The result of this analysis is shown in Table 1.



Source: author's literature review, displayed according to the PRISMA-P method [11]

Figure 1: Process of literature selection and used criteria of literature review to determine quantitative CIO effectiveness research.

Table 1: Used management theories in identified research

	(Enns, Huff & Golden , 2003)	(Smaltz, Sambamurthy & Agarwal , 2006)	(Li et al. , 2006)	(Sobol & Klein , 2009)	(COHEN & DENNIS , 2010)	(Johnson & Lederer , 2010)	(Chen & Wu , 2011)	(Li & Tan , 2013)	(Ding, Li & George , 2014)	(Ricciardi, Zardini & Rossignoli , 2018)	(Paré, Guillemette & Raymond , 2020)
Socialization Theory	x										
(Modified) Vocational choice	x										
Role based performance Theory		x							x		
role-based stakeholder assessment theory		x									
Upper echelon theory			x	x	x			x	x		
learning theory			x					x			
portfolio theory			x					x			
IT strategic alignment						x					
Uncertainty reduction theory						x					
Strobe (Stroepis)						x					
Job characteristics theory							x				
Activity competency model							x				
Empowerment theory							x				
Rewards theory								x			
Trait theory of Personality								x			
Theory of organizational integration/differentiation										x	
resource-based view (RBV) and its sister theories										x	
the strategic alignment view						S				x	
theory of IT function in organizations											x

x: Mentioned Theories in Publications
S: Source of Theory for other scholars

Sources mentioned in this Table: [12–22]
Source: author's literature analysis

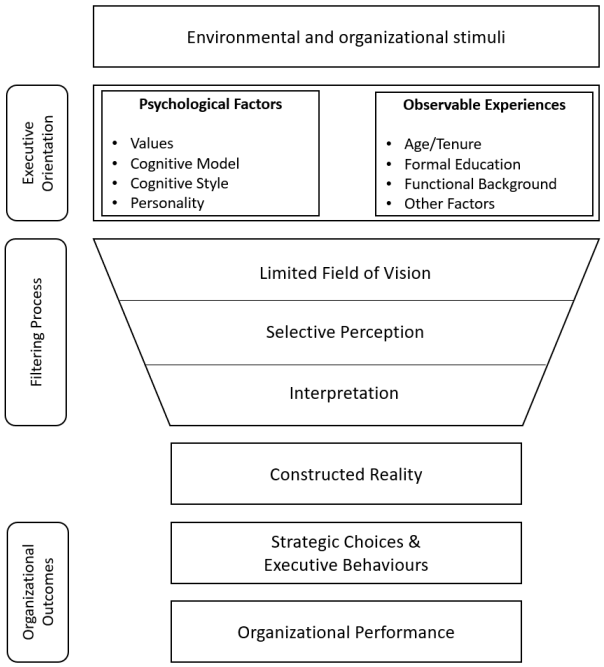
2. Theoretical Framework

2.1 Available Research bases on Upper Echelon Theory

The dominant model used in the CIO effectiveness research is the upper echelon theory. Hambrick states "If we want to understand why organizations do the things they do, or why they perform the way they do, we must consider the biases and dispositions of their most powerful actors - their top executives" [23].

This view bases on Hambricks and Masons Paper "Upper Echelons: The Organization as a Reflection of its Top Managers" which was published in 1984 [24]. The considerations, reflected in this paper, base on earlier research about behavioral decision making.

Hambrick & Mason tried to structure and formalize existing knowledge about the correlation between top managers, strategy and the success of companies. In the focus of the developed framework is the behavior and the way of information processing of individuals. The Authors argue that situations which top managers are confronted with, are typically highly complex. Figure 3 describes the filtering process.



Source: Adapted from Hambrick and Manson [24]
Figure 2: Strategic Choice under condition of bonded reality

According to Cyert and Marchs [25] concept of "bounded rationality" it is reasoned that it is impossible to perceive, process and judge on all relevant information and events within and outside of organizations.

Each manager filters information based on his/her individual values, norms and experience in order to reduce complexity of decision situations. The psychological personality traits are decisive how an individual

experiences a situation, selects information and interprets it [24]. After this filtering process the top manager has a subjective view on an objective reality or in other words a constructed reality. This in term is the bases for the strategic choices taken and brought forward through the behaviors of the individual executive. The result of these actions and behaviors are observed as the organizational performance either on department level or on the company level.

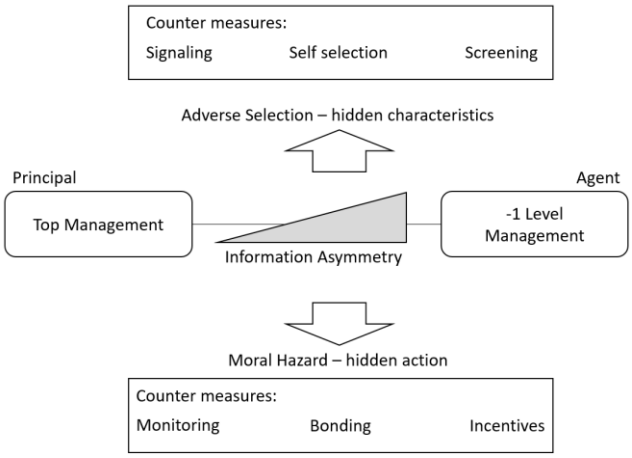
2.2 Can the Principal Agent Theory support changes in management behaviour?

The Principal Agent Theory [26] bases on the fact that a Top Manager (Principal) looks for a specialist (agent) for a specific management job. In the cause of the selection process the Principal has to deal with the fact that there is a information asymmetry between him and the candidate. To evaluate the suitability of the candidate for the job and in turn to prevent adverse selection he can try to investigate the hidden characteristics of the candidate by different methods like signaling, self-selection and screening.

The area of adverse selection is based on Andrew M. Spences formulated thoughts published in the article "Job Market Signaling" [28] and his dissertation "Market Signaling: Informal Transfer in Hiring and Related Screening Processes" [29]. Variables for further research need to be aligned with Spence work.

After the candidate is employed, new risks arise for the Principal also based on the information asymmetry. The new specialist member has a better understanding of his area of responsibility and possibilities for future development and operation. This might result in the fact that the agent is performing his action not fully in line with the strategy and goals of the Top Management, which might result in opportunistic cost. Measures to compensate this risk are Monitoring, Bonding and Incentives. All associated with cost, which should be lower than the cost for opportunistic behaviour of the agent.

Countermeasures have the duty to avoid the risks associated with the Principal-Agent relationship between Top Manager and IT Manager. Figure 3 shows the interdependence within the Principal-Agent-Model regarding countermeasures.



Source: authors construction
Figure 3: Countermeasures to reduce risk within the Principal agent model.

The Countermeasure "Monitoring" is assigned with several variables, which have been classified by the author into two groups: direct performance indicators and indirect performance indicators. Direct indicators can be measured by or within the IT organization. Indirect indicators are company related constructs.

In the area of Moral Hazard, to detect hidden action, no research has investigated the countermeasures and effects of bonding and incentive.
The bases for future research in this area could be the Herzbergs Rewards Theory originally published in 1968 [30] and consequent research on the topic.

Li and Tan postulate that: "It has implied that the lack of extrinsic rewards such as pay raise, merit bonuses, and job promotion is related to job dissatisfaction and lack of motivation for a CIO to initiate a project. Given that older CIOs may have fewer years before retirement, they may not be able to realize the pay-off from IT investment on time to translate it into higher salary and bonuses. Thus, they tend to formulate IT strategy that is stable and cost efficient, which matches the needs of defenders. In contrast, because their career and financial security concerns have a longer time horizon, younger CIOs can be more risk seeking in adopting more innovative and flexible IT strategy, which will align with the prospectors' business requirement." [19]

3. Research setting

Based on the idea of investigating causes of CIO effectiveness, incorporating the ideas of the principal-agent-theory, an empirical quantitative survey will be conducted. Following sequence of the research project tasks have been planned:

a. Literature Review and generation of research questions.
b. First round of expert interviews with pensioned CIOs.
c. Creation of research model in form of a SEM.
d. Creation of hypotheses based on the SEM.

e. Questionnaire design.
   I. Variable validation through mixed method research based on structured content analysis of job advertisements. [31–34].
   II. Scale development.
   III. Pilot study.
   IV. Scale modification.
f. Survey.
g. Data analysis.
h. Final decision on relevant construct of the original SEM by statistical analysis.
i. Adoption of SEM (scope limitation) and rework of theory part.
j. Process steps h and j will be supplemented with expert interviews of 2 professors for information management, 2 experienced CEOs, 2 experienced CFOs and 2 acting CIOs.

4. Research object

The company Bisnode maintains the former "Hoppenstedt Firmendatenbank". This database consists of information about German companies with financial numbers, addresses and names of 1st and 2nd level managers. For this research, a selection of companies located in Germany with the criteria of >125 Mio€/a turnover was acquired, which is displayed in Table 2.

Table 2: Overall planed population and sample size

Population (Companies >125 Mio. € Turnover per year in Germany)	7471		
Companies with available CIO Name	3021		40,44%
Batch 1: Invitations by e-mail	2177	72,06%	29,14%
Batch 2: Invitations by mail (Post)	844	27,93%	11,29%

Source: author's database analysis

In a first batch, Companies with available e-mail addresses and names of CIOs will be approached electronically by personalized e-mails.

In a second batch, Companies where only the names of the CIOs are known, but no e-mail address, the contact will be established depending on the return rate of the first batch. If the return rate from batch one is sufficient to gain statistical significance, no second batch will be sent out.

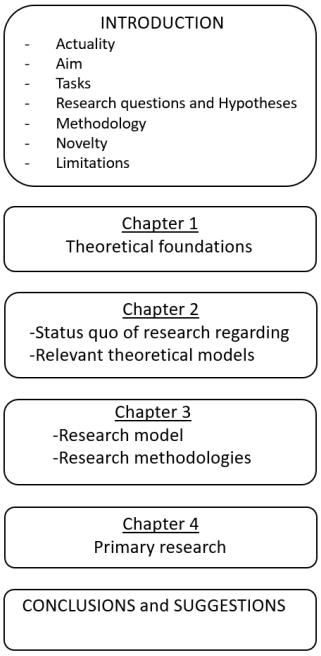
5. Content and structure of the thesis

The introductory chapter will cover question of actuality, aim, tasks, followed by research questions and main hypotheses as well as the research methodology and the limitations of the research.

Chapter one describes the theoretical foundations of the research which will be enriched by the status quo of available scientific research outlined in chapter two.

In chapter three the research model and the used methodologies will be described in detail, which will then be followed by the primary research results in chapter four.

A Conclusion and Suggestions chapter with the summary of results, formulation of conclusions, based on theoretical and empirical knowledge, answering of research questions and falsification of hypotheses will lead to suggestions for further research and for practitioners in management functions. Figure 4 gives an outline about the structure and content of the thesis.



Source: Own construction
Figure 4: proposed structure of doctoral thesis

6. Results

The paper gives a compressed overview about the research project containing considarations about the theoretical framework, research setting, research object and content of the thesis.

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BUSINESS VALUE PARAMETERS TO PROMOTE ENVIRONMENTAL SUSTAINABILITY

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Abstract: *The issue of environmental sustainability is an increasingly discussed topic, not only in business, but in society. This fact changes the perception of the values of products and brands from the perspective of the customer, but also from the perspective of the company itself. The article deals with the analysis of consumer behaviour and preferences in the field of product selection regarding the natural environment. The data are the analytical result of a consumer survey by L´Observatoire Cetelem. These results are set in confrontation with the solution of CSR issues in Slovak companies and their application to business models of companies. Based on the analysis of the case study, as well as analyses of secondary data, the article publishes proposals for areas for the management of value parameters in the field of environmental sustainability in common business practice. The aim of the article is to provide a general overview of the issue, name the parameters of value and define their sense of business practice. The basis of the application of new knowledge in practice is its interpretation and thorough analysis. For this reason, the article deals primarily with the explicit definition of individual elements for the promotion of sustainability in enterprises.*

Keywords: *best practise, sustainability, value of sustainability, value management, environmental management*

1. Introduction

Sustainability as an aspect of the circular functioning of business models should be a major part of business. The article presents the results of research, the main goal of which is to analyse the level of perception of the importance of sustainability in Slovakia, but also an overall view of the change in customer values through secondary research by Cetelem. The level of awareness in the given issue on the Slovak market is low in comparison with abroad. But companies are beginning to actively address this issue.

The Slovak business environment is mostly composed of small and medium-sized enterprises. Changes in business processes are therefore brought to the market mainly by corporate companies operating in Slovakia, but their parent branches are foreign. In this way, innovations come to our market and are gradually transformed into the ordinary environment. Within the framework of sustainability and corporate responsibility, it was possible to publish partial findings in the article entitled Analysis of the perceived value of sustainability in Slovak companies in the food industry. [1] This paper was the previous step of the article, which continues to research the sustainability of the business environment and its parameters.

2. Theoretical basis and methodology

The current situation in the field of sustainability and addressing global issues is a topic that affects both final consumers and businesses. The pressure to change the environmental burden comes not only from the European Union, but also from the customer. Consumers are beginning to realize the effects of their purchasing choice and are actively addressing not only the quality and price of the products they buy, but also their origin, composition, or the side effects caused by the production itself. [2, 3] Businesses are therefore forced to change their activities globally and locally, as well as products.

The World Economic Forum examines the behaviour of the millennials, who make up a quarter of the world's population. Their shopping behaviour changes significantly. Research shows that it is this customer sample that is aware of the implications of its purchasing decision and sees brand sustainability as a compelling argument when choosing products and services. Even research claims that up to 84% of millennials feel the duty of their generation to change the world. [4] Young people's values are set in a human way and they feel responsible for solving social situations. Their personal commitment gives them a sense of inner satisfaction. [5] A significant difference between the situation in Slovakia and in the world is that in the world value management and overall sustainable view of responsible business has been a trend since 2004-2005, while in Slovakia corporate responsibility, intrinsic value of companies and sustainability are addressed only in sphere of corporate companies. [6.7]

The article deals with the analysis of the environment and activities related to this issue on the Slovak market. The methodological approach was based on revealing the results and findings based not only on the processed secondary data and their subsequent analysis and comparison with the results of the case study analysis.

3. Results

The main aim of the research is focused on the definition of sustainability parameters. The first research about customer behaviour provides secondary data, which shows current situation in this field.

3.1 Research of customer behaviour – L´Observatoire Cetelem 2017

Cetelem's quantitative research involved 15 European countries, with a research sample of 12,200 respondents aged 18-75 and collected in November 2016. The research used the CAWI technique and respondents were selected from a representative sample of each countries. The quota to provide a representative sample was (sex, age, profession, income). The survey involved the following countries: France, Germany, Austria, Belgium, Bulgaria, Denmark, Spain, Italy, Portugal, the United Kingdom, Hungary, Poland, the Czech Republic, Slovakia, and Romania. For the qualitative part of the research, it was made available online and sent to 20 consumers in France to comment in an online forum for 8 days (5-12 December 2016). Consumer behaviour survey focused on consumer confidence. The survey explains what the perception of trust in society is in relation to purchasing behaviour and how it affects the economy. The basic hypothesis of the survey is based on the idea that if the consumer and individual business entities (companies) do not feel trust, they start the so-called, game of restraint and waiting for safer conditions and thus cause a slowdown in the economy. In most European countries, changes in confidence were felt during the economic crisis. The level of confidence decreased significantly. The question of how to revive confidence is therefore essential, not only for business, but for the whole economic system. For this reason, the L´Observatoire Cetelem 2017 survey focused on the level of trust and its measurable parameters. [8]

Trust as a condition for growth

The main precondition for economic growth is the growth of confidence. Economic growth is the basis of many factors - fluctuations, unemployment rates, differences in purchasing power, but also the very trust in economic entities. All these factors affect the overall rate of economic growth. All factors are intertwined, and it is not possible for one to work without the other.

The environment and its perception

As many as 74% of Europeans are concerned about changes in the environment in the future. This finding also supports the importance of addressing sustainability, which is significantly linked to environmental protection and conservation for future generations. This fact is supported by another conclusion from the survey, where only 27% of respondents are optimistic about the fate of future generations (for Slovakia only 21%). On the other hand, among the factors that would have a positive effect on the change in each country, the dealing with the environment was at a low level (only 15% of respondents identified this factor). This fact may also be influenced by the fact that people do not trust public organizations and even place the least trust in politicians themselves. Most political promises are not fulfilled during one election period, and as a result, people lose confidence in change.

Generational differences in consumer perceptions

Findings for further research are primarily differences in the perception of values when comparing generational differences. But also influencing the perception of society and its situation with personal happiness and appreciation of personal life. The essence of the necessity of connecting value creation, as well as the creations of trust, requires the involvement of the whole system as a whole. None of these qualitative elements of society will exist only separately in certain forms of society. Values can be transformed e.g. beliefs for a certain group of people, in any case, if these values are not applied to other societies, then their comprehensive fulfilment is not realistic. Values must be shared by all stakeholders. Otherwise, they will only be the values of individuals who can recognize them together, such as in faith, but we will not achieve such a societal benefit. In this case, the confidence survey is a parameter of value. If our value is trust, then the individual findings can be applied for further research. The state of society, whether economic or personal, is essential for understanding the situation in the consumer market, for a clear setting of research and its level.

These results therefore suggest that it is necessary to build awareness of the environment and sustainability, so that the population perceives this factor as an important way to support the positive development of phenomena in the country in the future.

3.2 Research of a case study in Slovakia - CSR activities in Slovak industries

In Slovakia, social responsibility is perceived most significantly in the food industry. [14] Probably due to the fact that in this area the impact of waste and waste is easily communicable to the public and every ordinary person is aware of the value of wasted food from the point of view of people in need who do not have access to it. It is this fact called. The direct connection with the problem is very important in the subsequent realization that if the goal is to solve social problems, the primary goal must be their empathy for the impacts of the problem. The change in thinking comes from different angles, but it is Lidl's approach that is the real personification of professional practice in the given issue. Explanation, education, and a human approach with societal values. The latest available report from Lidl z r. 2020 describes how a company understands social responsibility. This personal approach to the issue lays the foundations for creating value systems in the field of CSR throughout Slovakia, and not only in the food or gastronomy industry. Lidl's CEO describes simplicity, accessibility for all, and nationwide influence as key values. He named the strategic areas of CSR as the Lidl CSR World. The report feels that the General Manager of Lidl Operations in Slovakia is proud of the activities that the company promotes in this area. [9]

Five strategic areas of Lidl Slovakia's CSR activities:

- We build a quality and safe RANGE
- We cooperate with SUPPLIERS
- We protect the ENVIRONMENT

- We support EMPLOYEES
- We HELP COMPANIES

Lidl Slovakia has precisely set goals in individual areas. It also defines the processes and procedures for fulfilling the given goals and lists the specific activities that it does to meet the individual goals. Most of these activities not only are environmentally beneficial, but also solve society's problems. This type of effective approach is the way in which a company interacts directly with the customer and thus creates value together.

According to a FOCUS survey for the BLF - Business Leaders Forum, which was conducted in Slovakia in 2019, up to 94% of respondents think that companies should have, in addition to making a profit, goals in the field of responsible business - i.e. protecting the environment, caring about employees, support the surrounding community and communicate transparently and openly about their activities. 1,024 respondents took part in this representative survey, which takes place every two years. According to its results, the public considers the support of environmental protection and climate change mitigation to be the most important (53%). Compared to 2017, the essence of this issue increased by up to 12%. Furthermore, topics such as support for socially or health-disadvantaged groups of the population and efforts to include them 42%, support for the education of the young generation 42%, or the fight against corruption up to 37% are considered important. [10]

Lidl already has an updated accountability management model, which consists of 4 main areas, articles of the VALUE CHAIN, which are divided into 11 areas of responsibility and 41 partially strategically important topics. The model analyses the risks of meeting sustainability goals, seeks solutions, and integrates new findings into business processes. "It is our daily practice to exchange ideas with experts and to obtain feedback from Lidl's internal and external stakeholders." [10] Lidl even models the differentiation of the topics addressed, distinguishing the topics that emerged as most relevant according to stakeholder analysis (stakeholder analysis) and topics of high importance to Lidl and thus devotes a high degree of transparency.

4. Recommendations

Through the analysis of secondary data in the field of consumer research, it was possible to determine the basic preferences of consumers. Their perception and areas of value that are considered in their purchasing process. These data were confronted with already applied methodologies and approaches in the field of CSR activities in Slovak companies in the food industry, as this segment in the Slovak market CSR activities in common practice and brings a number of new perspectives and applications into everyday consumer life. The level of consumer knowledge is therefore increasing in this topic and therefore there is room in this topic for defining new directions and approaches in the field of value management to support sustainability in the business environment.

4.1 Defining the concepts of sustainability within the solved problems

Based on the level of knowledge, it is possible to determine the awareness of individual business entities in each issue and determine the need for their education before designing and implementing a model of sustainable values. The parameters of the values were determined in the previous research and are the result of the preliminary research within the given dissertation.

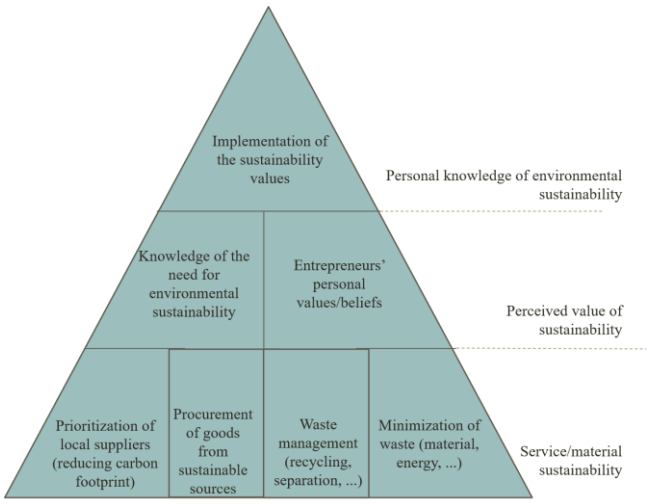

Figure 1: The levels of sustainable parameters´ implementation

From previous research, which was developed in a pilot study and in case studies, it is evident that without sufficient interconnection of all stakeholders, the values of sustainability in the business environment cannot be successfully applied. The first step is education and gaining knowledge in this area. If the entrepreneur is convinced of the need to address environmental sustainability, he is motivated to transform these values not only into the business but also into the personal environment. Its perceived value of sustainability is at the level when it can apply its parameters to the corporate sphere. Cetelem's survey describing the essence of the level of trust in cooperation is also valid with the opinion of R. Strand, who, like Cetelem, describes that if the common values are not fulfilled and harmonized within stakeholders, it is not possible to ensure the necessary level of trust to meet common goals. pages. [10, 11]

The figure describing the levels of knowledge of environmental sustainability represents a visual prioritization of the process necessary to meet the sustainability goals. The basic part of knowledge of sustainability and its parameters is the operational / material level of knowledge of sustainability. This level is the content of research.

The level of perception of the value of sustainability represents an internal awareness of the urgent need to address issues related to global issues and environmental sustainability. This is a stage where we are not only aware, but we can also rationally evaluate why it is necessary and we are internally convinced of that. If, within the framework of understanding and rational evaluation, we can move to the stage of active change of lifestyle and business style to a sustainable approach. It is a level of personal understanding where sustainability values are actively implemented.

4.2 Defining the main elements of business sustainability

Value management has proven to be a complex system of diverse elements from different environments. The need to define common goals, stakeholders and set shared sustainability value parameters are necessary conditions for creating an environment suitable for the implementation of a model solution for value management with goals to support sustainability. For this reason, it is necessary to define what stakeholders enter this system, what their role and position in value creation within the corporate structure.

Stakeholders

Stakeholders in value creation are all entities and elements that can influence any of the elements of value. These are participants in the interactive environment of the company. In the previous publication, the main stakeholders of value creation were defined - the company and the environment in which the company operates. [12] I.e. actors in the direct supply chain, customers, and the company itself. During the research, and especially in the qualitative part, the influence of the government on the motivation of entrepreneurs towards sustainable innovations was obvious. Entrepreneurs felt that some of the sustainable innovations required not only structural and process changes, but also material innovations that are economically demanding. In some cases, entrepreneurs felt offended by their motivation to solve a social problem that is financially supported by higher bodies, such as funds for the development of waste management, supported by the European Union, etc. Nevertheless, even when applying for example. Separation containers were not complied with by entrepreneurs. At this point, it is necessary to list the government in the stakeholder section as a participant influencing value creation from the point of view of creating conditions for value creation. It is therefore not a direct intervention, but a stakeholder that has a very strong influence on the intensity and speed of implementation of most elements of the value of sustainability.

The following figure shows the stakeholders from the point of view of the internal and external environment and their functional cooperation enabling the conditions for the existence of sustainability within the interactive environment of the company.

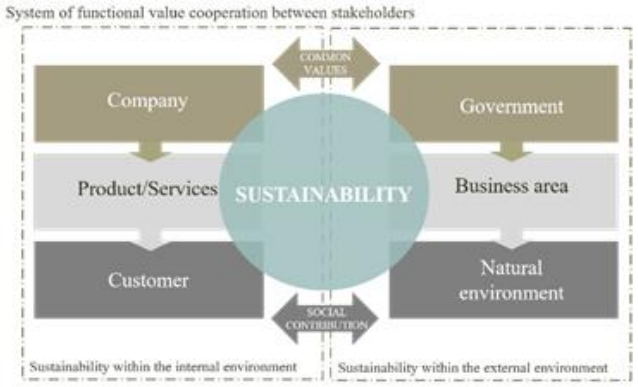

Figure 2: System of functional value cooperation between stakeholders

Parameters of sustainability

Based on the analysis of the current situation, through secondary research conducted in Slovakia, their necessity of parameters within the model solution in the implementation of values into the business model of the company was confirmed. However, the parameters underwent stylistic correction, also on the basis of theoretical data, where the parameters were adjusted to name the activities and activities by which they were represented during the research, but in the theoretical outputs were not named exactly the same. These are therefore changing from the original research published in the previous article. [13]

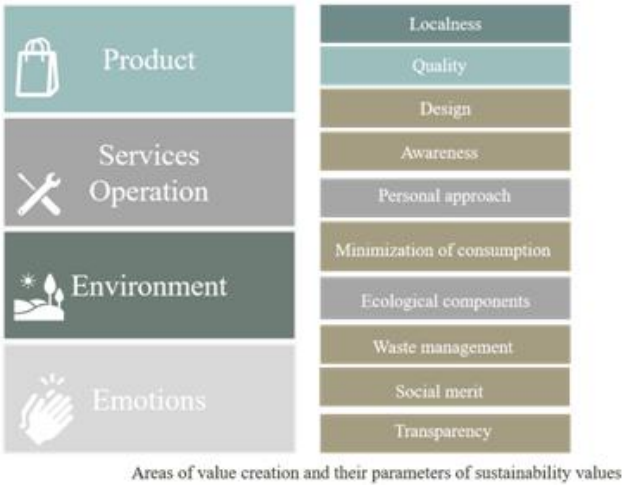

Figure 3: Areas of value creation and their parameters of sustainability values

The arrangement indicates the prioritization of sustainability flows (information, material, and process). In the upper part, there are priority common values that connect the company and the state (government bodies at all levels - district, national, ...). An increased level of trust between stakeholders is expected when setting common values. Once common goals have been defined in terms of sustainable values, these goals can be taken to a lower level through a strategic approach. In the case of a business, it is

the level of product and service. In a government situation, it is a business environment that should be positively supported and should obtain sufficient necessary resources (information, material, process) to ensure sustainability goals. The last flow represents the impact of the goals on the end "customer", although in the case of the internal environment it is the real customer, in the case of the external environment it is the environmental environment that will mirror compliance with sustainability goals implemented in the business environment. However, unlike the environment, the customer is a stakeholder who has a high level of influence on sustainability support, as it is through their purchasing choices that it decides whether to support the environmental environment. The question could arise why the arrow of social benefit is two-sided and does not go only from the customer to the environmental environment. This system assumes that all stakeholders will recognize the same values, in which case the positive impact of the existence of companies on the environment will have a positive impact on the environment in general. Which means cleaner air, water, reducing the amount of waste produced, etc. And these are perceived as positive impacts of the environment on the company / customer. For this reason, the arrow is double-sided.

5. Discussion

Within the system of functional cooperation within stakeholders from the point of view of promoting sustainability in companies, specific representatives of stakeholders who enter value creation are defined. From a corporate perspective, the value creator is the management of the company. It has the highest priority and sets goals within the value of sustainability. The fulfilment of these goals is influenced by the government (at all levels of management), suppliers and business partners, who directly influence value creation. In terms of impacts on sustainability parameters, it is the entities, suppliers and business partners that are key stakeholders in cooperating to promote sustainability values. The company and the customer represent a stakeholder, which is the main motivating element of creating value for sustainability, as the values are set to affect the environment in the maximum possible positive extent. A necessary precondition for the functioning of the proposed solutions is the company's determination to solve the company's issues. Thus, the awareness of the company that the value of the company must be part of societal values and must be transformed into the culture of the company and thus among all members of the business team. Only then is it possible to transfer value between stakeholders (suppliers, environment, customers, ...).

6. Conclusions

The article provides basic areas of value creation aimed at promoting sustainability in the business sector. It describes research on consumer behaviour focused on the nature of trust in the consumer chain and points to the current situation in the field of CSR in Slovakia. The results of the article show the main areas of solution for the implementation of value parameters in business practice and their prioritization.

These outputs were the main part of the research part. The research part paid attention to the current situation in the issue - solving sustainable business models in the world and in Slovakia, but also CSR issues in large companies, which served as examples of best practice in the case study. However, the area of this issue is relatively unexplored, and the market constantly provides a few stimuli for change in business, which brings more positive approaches to the environmental environment and reduces the overall negative impact on society.

Acknowledgements

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Session: Economy, Financing, Public Administration

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"ECOLOGICAL" DIGITALIZATION - POTENTIALS, LIMITS, DANGERS

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Abstract: *The change in society and in the economy due to digitization goes hand in hand with climate change and steadily increasing energy consumption. The challenges of sustainable economies are the subject of ubiquitous debates around the world. This article describes to what extent the ecological goals of a networked world are supported by intelligent communication technology (ICT), digital end devices such as smartphones or the Internet in general. The potential, limits and dangers of digitization are also pointed out. Can digitization help to substantially reduce the consumption of energy and natural resources? An outlook and considerations in the technical, political-economic and social context for successful sustainable action in the ecological sense conclude the article.*

Keywords: *Digitization, big data, Internet of Things, ecology, smartphone, electronic waste*

1. Introduction

Big data, digitization and artificial intelligence (AI) are fundamentally changing the economy and society. Intelligent machines in the "smart" factories will free employees from seemingly monotonous work and cause social upheavals, as they should be comparable to the extent of their redesign with the first and second industrial revolutions. On the other hand, these upheavals will also have direct and indirect effects on consumer behavior and thus on the environment. Collaborative solutions and cloud applications are therefore the future-oriented and promising trends of the 21st century. Over a third of Internet users in the European Union (EU) now use cloud services - and the trend is rising. Figure 1 shows the percentage of cloud users broken down by country in 2016 and 2019. [1]

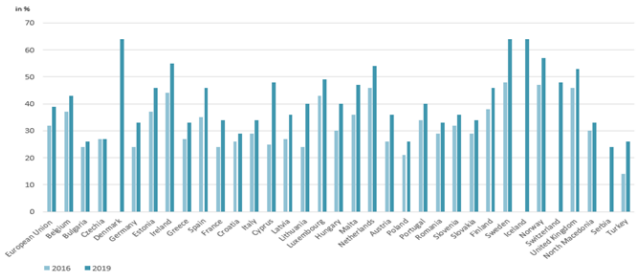

Figure 1: Use of cloud services from 2016 and 2019 (own presentation)

The ability to save large amounts of data of various types and forms, regardless of the device used, demands more and more storage space - and thus servers that have to be cooled and more resources. The usage habits or the purpose of the World Wide Web are rather entertaining in nature. The most frequent internet activities among 16 to 74-year-olds in the EU in 2019 were sending / receiving e-mails (73%), searching for information on goods and services, i.e. consumption (66%) and reading online news sites, Newspapers or magazines (62%). A majority of adults also used the Internet for Internet banking (55%), using social networks (54%) and consuming video content (54%) (multiple answers were possible). [2] The question of the energy consumption of these activities is largely ignored.

The power consumption of a search query on Google alone is approx. 0.3 watts per hour. In 2018, global searches per day on that search engine amounted to 3.45 billion. [3, 4] This corresponds to an energy consumption of approximately 1,000,000 kilowatt hours or 1 megawatt hour. A medium-sized power plant has a daily nominal output of approx. 30 megawatt hours. Such a power plant must therefore be put into operation for around one school hour (45 min) every day in order to guarantee energetic search queries on Google. [5] This example shows that the digital world is more than just a virtual structure, it exists physically and thus consumes real resources. The entire network infrastructure in Germany consumes around 55 terawatt hours per year, which in turn requires around 10 medium-sized power plants for the energy supply.

2. Ecological dangers of digitization

Part of the generation of energy today is always associated with the burning of fossil fuels. Energy that is necessary to run machines, transmit information, make search queries, stream videos and cool servers. With regard to CO2 emissions, this means that whenever combustion takes place for energy generation, CO2 is released into the atmosphere at the same time. The CO2 problem occupies the climate researchers to a great extent and in politics the knowledge that science provides about relationships in nature is not taken seriously enough. Political goals for climate protection and specifically to limit the global rise in temperature were already defined in the Paris Climate Agreement in 2015. [6]

Resource consumption and emissions resulting from the manufacture, use and disposal of hardware can be counted as direct environmental impacts in this context. If the new technology is applied, the induced changes in consumer

behavior and production patterns can have indirect ecological effects. [7]

Another challenge is the increasing networking of devices. Machine to Machine (M2M) can be tracked quite easily thanks to the standard tracking technology, while these devices are connected via Bluetooth and WiFi in the Internet of Things. It is more difficult to determine the carbon footprint of a networked society. As early as 2013, the footprint up to 2020 was forecast in a study. [8] The scenario included a billion new ICT (intelligent communication technologies) access points, including wireless base stations and communication modules that are to be built into non-ICT devices. Despite the large number of new networked devices, the study shows that the carbon footprint should be relatively small. Recent studies show that the estimated numbers in terms of the number of connected devices were predicted quite well. Public displays, surveillance cameras, payment terminals, intelligent meters, household appliances, etc., which can be referred to as ICT in the context of the Internet of Things (IoT), are now also included. Estimates suggest that ICT modules, due to their connectivity, will further increase the carbon footprint, albeit no longer with exponential dynamics. Data traffic increased by a factor of one million between 1995 and 2015, while the energy consumption of the ICT sector increased three times. Although the energy footprint increases with increasing data volumes, it correlates more strongly with the significantly increased subscriber volume, which is caused, for example, by streaming services. [9] The subscribers of the company Netflix, which operates in the video-on-demand business, are to be used as a representative. This streaming service accounts for more than a third of all US internet traffic. [10]

Data centers around the world are estimated to consume more than 200 terawatt hours per year. For comparison: This corresponds to around two thirds of the total energy consumption in Italy in one year. [11] The trends, which have been published in countless studies, predict increasing electricity consumption until 2030. Wired data traffic and data access via WLAN is currently increasing faster than the improvements in power efficiency that could compensate for this additional demand. [12]

According to trend research, the energy requirements required for this will also increase in production or with regard to consumer devices. Figure 3 shows the growth trends in global electricity consumption in the various areas of application of communication technologies.

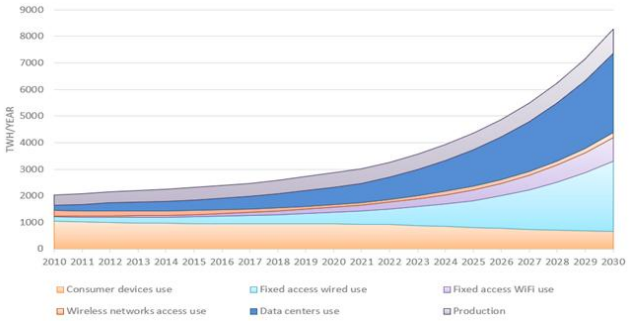

Figure 2 - Expected case scenario CT electricity (own presentation based on Andrae; Edler)

3. Potentials, Rebound effects and product life cycles

According to trend research, the energy requirements required for this will also increase in production or with regard to consumer devices. Figure 3 shows the growth trends in global electricity consumption in the various areas of application of ICT. Overall, CO2 emissions in Germany could thus be reduced by 120 megatons by 2030. In 2019, CO2 emissions in Germany were 805 megatons. The agreed target for 2030 in Germany is 543 megatons. Research approaches that deal with the potential of digital solutions also exist in other areas of the economy, such as "Buildings" and "Work and Business". [13]

The advanced technologies are undoubtedly able to reduce emissions. Overall, products can be manufactured more efficiently and therefore more resource-friendly. But this also leads to ever faster demand for the latest product. A rebound effect is therefore a feedback mechanism that only partially or not at all realizes potential savings from efficiency increases. [14] The potential for savings typically lies in cost advantages that can be achieved, for example, through synergy effects. Lower costs usually lead to lower prices and thus to broader consumer access, and consequently to higher demand. The shared use of computing resources, the online provision of scalable IT services or the storage of large data in a cloud make the cloud computing model appear efficient and attractive in terms of its use.[15] As a result, the increasing use also generates a higher demand on the part of hardware usage, which in turn creates the need to produce more. This means that resource consumption increases, product variants increase and product life cycles are shortened to the same extent. This development can not only be observed in consumer goods, but also in mechanical and plant engineering.

A controversial term in this context is planned obsolescence. Through permanent cost management and utilization of synergy effects, the individual components are becoming cheaper and cheaper. This consideration thus leaves room for preference for a new product over repairing or upgrading a used item. "Breaking points, product bans, overengineering or approaches such as cradle-to-cradle [...] indicate that in some cases avoiding delayed obsolescence is a sensible concept and allows

significantly more resource-saving product configurations than would be the case with the primacy of longevity." [16] It seems, therefore, that the industry is benevolent towards the planned obsolescence. The sales figures for digital devices do not contradict this.

Using the example of smartphone sales, it becomes clear that the number of smartphones sold worldwide will more than tenfold from around 122 million devices in 2007 to around 1300 million devices in 2020. [17] Conservation of resources could therefore only be considered if repairs and upgrades resulted in more material consumption than would be the case with new products - but this is not the case. Figure 1 shows the sales figures for smartphones between 2007 and 2020.[1]

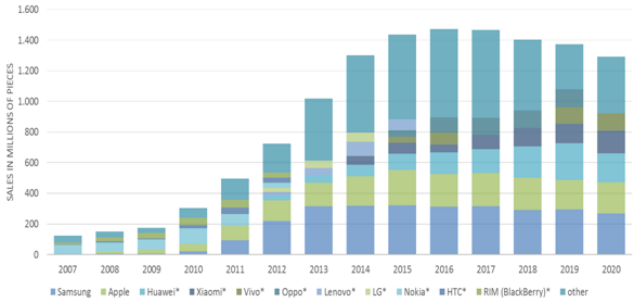

Figure 3 - Sales of Smartphones manufacturers worldwide by 2020 (own presentation)

The useful life of a smartphone in Germany is between 18 and 24 months. Apple itself specifies the assumed useful life of the first owner as three years. [18] In the case of smartphones, production is responsible for 84% of the total carbon footprint in relation to the life cycle. Converted, this corresponds to 48 kilograms of CO2 that can be allocated to production. [19]

A “more” in production and consumer goods inevitably leads to a “more” in required resources and thus in energy, which can probably not be compensated for by increasing efficiency. Large quantities of the raw material cobalt are required for the production of lithium-ion batteries, which are built into smartphones, among other things. Worldwide demand is currently 110,000 tons per year and, according to calculations by the Dera raw materials agency, will be between 187,000 and 225,000 tons by 2026. [20] More than 60% of the amount required worldwide is extracted in the Democratic Republic of the Congo. The dismantling contradicts an ecologically clean and socially acceptable understanding. Children who have to work in the cobalt mines ruin the environment first and ultimately ruin their own health. [21]

The last stage in the life of a product usually takes place in the landfill. Europe's largest dump for electronic waste is located in Ghana. Around 250,000 tons of electronic waste from the digitized world reach this place every year, making it a toxic everyday life for thousands of people. [22] It can be assumed that the demand for digital devices, hardware in general and digital lifestyle products will continue to grow - and this is accompanied by an increase in electronic waste. The children and young people who earn their livelihood on this landfill shred and melt the scrap, which means that raw materials are recovered. The description of the working conditions and their health consequences are self-explanatory.

In view of these facts, sustainable and holistic solutions must be found that go beyond technological progress.

4. Conclusion and inspiration for possible solutions

Digitization will increasingly and dynamically change the image of the economy and society on a national, European and global level. In doing so, this generation is leaving an ecological footprint that has never been left before in human history. The overexploitation of this planet reaches dimensions that make it almost impossible for the next generation, at the latest the next but one, to inhabit this planet. [23] Digitization and environmental protection must not be mutually exclusive, they have to complement one another! In order to prevent the ecological disaster, science, economy and society must succeed in developing sustainable designs in harmony. The following solutions are intended to be an example of inspiration for future holistic concepts.

<u>Technical solutions:</u>

Intelligent information technology can create networks where it makes sense to transmit information without delay. For example, building sensors could be coupled with weather services so that they can be heated with pinpoint accuracy and, if necessary, cooled. ICT help to reduce global emissions by drastically increasing the energy efficiency of buildings. In the past 25 years, building use accounted for more than half of the world's increased demand for electricity. With these measures alone, the potential savings are around 10% of today's energy requirements.

<u>Usage-related solutions:</u>

An increase in the useful life of ICT leads not only to an increase in energy efficiency but also to a significantly better climate balance. From an ecological point of view, the continued use of an outdated device makes much more sense than purchasing a new one after approx. Two years. An EU-wide extension of the service life on the part of consumers would lead to a reduction in CO2 emissions of 2.1 million tonnes. [19] An extension of the useful life requires acceptance by the consumer. This was confirmed in a survey. According to this, 64% of those questioned would like to use their ICT devices between five and ten years. [24] The industry could counteract this problem with a modular design. In addition, guaranteed software updates offered should be part of the standard. These would be indispensable in the event of an extension of the product lifespan, because the issue of security is playing an

[1] * Sales figures are not available in the years or have been estimated by Gartner.

increasingly important role in a highly networked world. A corresponding impetus would be necessary on the part of politics.

Political and economic solutions - creating incentive systems:
The previous climate policy, which has been carried out exclusively on a national level, seems to have more of a symbolic character. The empirical evidence clearly shows, among other things, the increase in emissions. In the manufacturing industry, both sustainability and energy efficiency are frequently discussed topics, but fail because of the consistent implementation of ecological content at the European level. The reason for this is insufficient pressure on costs from politics. The CO2 price, which has to be paid for every tonne emitted, should become the key instrument of climate policy. In order to achieve the climate targets agreed in Paris, it is necessary to set a CO2 price of 80 US dollars and increase it to 100 US dollars by 2030. [25] In 2016, the German Federal Environment Agency put the damage caused by greenhouse gas emissions in Germany at around 180 euros per tonne emitted. [26] The price per ton would have to be adjusted accordingly. There is little agreement on the level of the price, but in principle important sources of income could be generated with pricing systems for CO2 emissions. This money could then be used to implement essential infrastructure measures (e.g. water supply) and promote the development of renewable energy sources. In addition, there is no longer an alternative to using fossil fuels for companies with high CO2 emissions in terms of costs - it would even be unattractive. [23]

Social solutions:
Against the background of climate protection and the sustainability debate, it is essential, in view of the further increase in production, to consider the entire product cycle. Sustainability describes a form of economy that does not consume its own requirements. The potential to increase efficiency of digitization alone will not solve the ecological problem - rather, exacerbate it in some areas. From development to production to disposal, concepts must be drawn up with the involvement of the consumer and (if necessary) politicians, which offer sustainable and resource-saving solutions. Furthermore, the priority may have to be placed on the process section that has the greatest potential, i.e. production and transport or mobility. Logistics 4.0 could provide answers in this area. In the end, however, it is the customer who uses his purchasing power to decide what, when and how often to buy. Climate change also means social change, in the context of which topics such as distributive justice, the state of human development, the understanding of values or the future of work must be included. Progress, growth, economy on the one hand and ecological issues on the other are often controversially discussed. It's just the two sides of the same coin.

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SECTORAL ENVIRONMENT ANALYSIS AS A PART OF THE PROCESS OF DETERMINING THE VALUE OF A COMPANY

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Abstract: *The process of determining the value of a company does not focus only on the final value determined by the expert or expert organization. In this process, it is equally important to know the environment in which the evaluated company operates. The environment of the company brings important information that can help the company in making decisions in the field of strategic tasks and subsequently in their application of the tasks in practice. Also, by analysing the business environment, it is possible to identify the factors affecting the value of the company. The aim of the paper is to analyse the sectoral environment, which is part of the process of determining the value of the company. In the article, Porter's analysis of "5 competitive forces" was performed, which was applied to a selected service company operating in a selected sectoral environment. The information needed to perform the analysis was drawn mainly from the public database and from the website of the selected company.*

Keywords: *sectoral environment, Porter 's model, company value, competitive forces*

1. Introduction

For the purpose of quality determination of the value of the company, it is necessary to evaluate not only the company itself but also its environment in which the company is located. The analysis of the company's environment provides the expert or expert organization with an overview of the current situation and position of the evaluated company. The results obtained by the analysis of the environment are used mainly for the company and for setting its corporate strategy for the future, which can be transformed into the final value of the company [1].

The business environment is made up of various general factors that affect all stakeholders (companies) that are part of the environment. Factors that operate in the environment are monetary policy, fiscal policy, etc. Other factors that affect the business environment are those caused by state intervention, scientific and technical progress or the development of supply and demand in the market. The business environment is divided into two basic groups, namely the internal and external business environment. The external business environment is then divided into a micro-environment of the company and a macro-environment of the company [2].

The internal business environment is also referred to as the internal business environment, which consists of internal company rules and conditions in which resources are transformed. It is very important for a company to be able to identify its strengths and to be able to evaluate them. In addition to identifying specific strengths, the company should focus on analysing and identifying its weaknesses and determine whether the identified weaknesses can influence the company and its overall operation in the business environment. [3, 4].

The macro-environment of a company is a large environment in which there are factors that offer certain opportunities for the company, but on the other hand can also endanger the company in a certain direction [5]. According to Kotler and Armstrong (2007), the factors that are part of a given environment are divided into 6 basic environments: demographic environment, economic environment, natural environment, technological environment, political environment, and cultural environment. [6].

The company's microenvironment is represented by factors that affect the specific alternatives of a company that primarily focuses on satisfying the needs and desires of its customers. These factors, occurring in the microenvironment of the company, can include suppliers, service companies, competition, public relations, etc. These factors can be divided into two groups: a group of factors that are more easily influenced and a group of factors that are more difficult to influence. In practice, a company's microenvironment is often referred to as a sectoral (competitive) environment [7].

The sectoral (competitive) environment can be defined as a grouping of business entities that offer products or services that can be easily interchanged with other substitutes. The analysis of the sectoral environment provides valuable information on the primary characteristics of the sector. These characteristics may include, in particular, the structure of the sector, barriers to entry into the sector and the overall degree of regulation of the sector by the state and the sensitivity of the sector to changes in the economic cycle [8]. It is characteristic of the company's sectoral environment that it can fully or to some extent influence

the functioning of the company. The analysis of the sectoral environment can be realized through several approaches, namely SWOT analysis, Balanced Scorecard method, VRIO method. The most used method is Porter's model of "5 forces", which will be applied to the selected company in the presented article. [9].

Porter's "5 forces" model (Figure 1) is one of the important tools used by companies to identify and then assess their strategic position within the sector or to enter a new existing sector. Porter's framework of five competitive forces works on the principle of perceiving organizational strategy and business opportunities and threats that are in the company's external environment. The aim of Porter's analysis is to observe the competitive environment by looking directly at competitors or to consider a broader perspective that competes with the company [10].

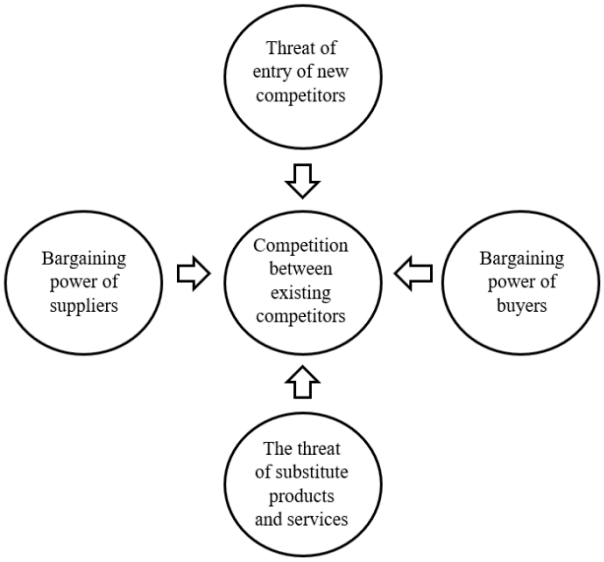

Figure 1: Porter's model of "5 forces"
Source: [2]

Porter's model of "5 forces" consists of:

- Competition between existing competitors - in the first place it is important to monitor the competitive pressures in the market, the necessary amount of investment necessary to attract customers, competitive advantages, market dynamics and competitive activity [10].
- Threat of entry of new competitors - the entry of potential new competitors into the market should be protected by entry barriers. One of the barriers to entry is a higher tax in the form of higher costs of entering the sector [10].
- The threat of substitute products and services - the presence of close substitute products or services of a competitor may have an impact mainly on the price of the product or service provided by another competing company [10].
- Bargaining power of buyers - if the buyer gets the price of the product or service to a minimum, the company's costs will increase. In addition to the impact on price, customers may require companies to add more value to production [10].
- Bargaining power of suppliers - many suppliers in the sector can cause an increase in prices for the supplied material or more favourable conditions when concluding a contract [10].

2. Goal and methodology

The aim of the article is to analyse the sectoral environment of the selected company. The fulfilment of the aim of the paper was preceded by a theoretical definition of the issue of analysis of the company's environment, specifically the sectoral environment. To perform the analysis in question, it was necessary to have available information related to the sectoral environment of the selected company. It was a wholesale environment for parts and accessories for motor vehicles, which according to the statistical classification of economic activities is numbered 45.31.0. The information was drawn from the FinStat public database, from the website of the selected company and from studies. In the theoretical definition of the problem, mainly book publications dealing with the issue were used. The methods used in the present article are the method of excerpting information, the method of synthesis, the Porter analysis of "5 forces" and the method of deduction.

3. Results

Selected company AZ CAR operates in the field of wholesale of parts and accessories for motor vehicles. The range it offers to its customers can provide for more than 400 different motor cars and trucks. In the following section, Porter's analysis of "5 forces" is performed.

Competition between existing competitors

The analysis of existing competitors of the selected company was performed through the FinStat database. In the FinStat database, specifically in the All Companies and Organizations database [11].

In terms of the analysis of existing competitors, aimed at dividing companies according to their scope within the region, the results are as follows:

- Banská Bystrica region - 59 companies,
- Bratislava region – 127 companies,
- Košice region – 47 companies,
- Nitra region – 78 companies,
- Prešov region – 33 companies,
- Trenčín region – 50 companies,
- Trnava region – 65 companies,
- Žilina region – 66 companies.

As the AZ CAR company has its operations within the Žilina region, it is therefore clear that in addition to AZ CAR, another 65 companies are engaged in the wholesale of motor vehicle parts and accessories. Within the region, the company AZUC, the largest competitor, is the company PRODUCEN, which operates, in addition to the wholesale of motor vehicle parts and accessories sector,

also in the sector of production of lifting and handling equipment. The primary business activity for PRODUCEN is the production of lifting and handling equipment. Since AZ CAR carries out distributions within the Žilina region, those companies that have established sales branches in which they provide the same (similar) assortment as the selected company also become competitors for it. The largest competitors for AZ CAR are Inter Cars Slovak republic, LKQ, Pirelli Slovakia and UNIX Auto.

From the point of view of competitors within the district division, AZ CAR can be considered a leader among other competitors in the Žilina district. It is also the largest employer in the district, operating in the sector. A total of 24 companies operate in the motor vehicle parts and accessories sector within the Žilina District, which represents 36.36% of the total number of listed competitors for the Žilina region.

From the point of view of achieved sales, it is possible to rank among the largest competitors of AZ CAR those companies that achieved higher sales than the given company. AZ CAR had sales for 2019 of € 17,873,780 [11]. AZ CAR's biggest competitors in terms of revenue include:

Table 1 Competitors of AZ CAR

No.	*Company*	*Sales (€)*	*Scope (region)*
1	PRODCEN	147 064 081	Žilina
2	EF Parts & Logistic Service	70 041 950	Bratislava
3	Inter Cars Slovenská republika	69 069 423	Bratislava
4	LKQ SK	49 729 697	Bratislava
5	ETOP International	29 653 365	Trenčín
6	Bohnenkamp, s. r. o.	27 313 023	Bratislava
7	IHLE SLOVAKIA LOGISTIC A SERVIS	18 892 250	Bratislava
8	AZ CAR	17 873 780	Žilina
9	NICHOLTRACKT	16 669 737	Banská Bystrica
10	Goodyear Slovakia	16 009 273	Bratislava

Source: [11]

Within the district competition, AZ CAR is the largest competitor for other companies operating in the same sector in terms of achieved revenues. From the point of view of the region and on the basis of the achieved revenues, the company PRODCEN is in the first place, which AZ CAR does not consider to be a competitor, as the primary business activity of the given company is the production of lifting and handling equipment. There are also companies in the district and in the region, which have established sales branches, e.g. LKQ SK (formerly Auto Kelly Slovakia), UNIX Auto, which are trying to gain new customers, which makes AZ CAR perceive them as significant competition. When identifying the largest competitors in the Slovak Republic in terms of sales, AZ CAR is in 8th place. In terms of identifying competition based on the amount of sales achieved, it is also possible to state that the company AZ CAR has competition mainly from the Bratislava region.

Threat of entry of new competitors

A threat to AZ CAR may be the entry of a new competitor that would provide spare parts imported from abroad, where it is possible for him to buy these spare parts cheaply and then sell them to his customers at significantly cheaper prices than AZ CAR.

Another threat could be the entry of a new competitor, whose activities specialize exclusively in the sale of spare parts for a particular brand of cars and based on its offer could close cooperation with several authorized services dedicated to servicing a particular brand either at the district, county or the whole state.

Other threats to the entry of new competitors could include those companies that sell spare parts not only through brick-and-mortar stores, but also try to offer their range to their customers through an online store. This means that they will allow them to make their purchase from the comfort of their home and will also bring the ordered goods directly to their address.

The threat of substitute products and services

The threat of substitute products and services may be the preference of citizens for other forms of transport than transport by car. At present, transport to work, school or the city is widely promoted by means of means of transport which have a lower burden on the environment than the just mentioned conventional passenger motor vehicles. Vehicles that are more environmentally friendly include suburban bus, urban bus, rail and electric passenger transport. In addition to the classic modes of transport, bicycles or scooters are currently used, which can adequately transport the citizen to work, school or the necessary place.

Passenger transport statistics (Eurostat, 2017) show that in 2017, up to 74.4% of the population of the Slovak Republic travelled by motor vehicle, 15.7% used urban and suburban bus transport and 9.9% travelled by train [12]. In terms of the use of new forms of motor vehicles (electric vehicles) by citizens of the Slovak Republic, ZAP states that in 2020 918 electric vehicles were sold, which represents an increase of 165 such vehicles compared to 2019 [13]. According to Eurostat results, it can be said that the area of sales of spare parts for motor vehicles is not endangered by other modes of transport. In the event that transport by motor vehicles begins to be gradually replaced by a form of transport other than a motor vehicle, a situation may arise where the production of conventional spare parts would not take place in the same volume as at present. This phenomenon would then be reflected, inter alia, in the production of spare parts, but in the subsequent sale to wholesalers at higher prices and subsequently also in the sale to the final consumer at higher prices.

As citizens start using transport (bus, train, bicycle, scooter), which has a lower burden on the environment, businesses selling motor vehicle spare parts will start selling fewer spare parts, which will be reflected in their

sales. Transport by electric car does not pose a threat to AZ CAR, as the spare parts for a classic motor vehicle and an electric car are the same.

Bargaining power of buyers

For AZ CAR, the largest customer base is car repair shops, which buy spare parts for cars as well as trucks from them. In addition to car repair shops, AZ CAR customers are also customers who repair their personal motor vehicles themselves or through small service technicians. The choice of AZ CAR as a seller of spare parts by customers depends mainly on the quality of the products provided and, finally, on the selling price at which AZ CAR sells spare parts. For AZ CAR to maintain its broad client base, it is necessary that it does not compromise on the quality of the products and services provided to its customers.

If the company wants to expand its client base, it should conduct a survey on the awareness of AZ CAR and its products among customers outside the Žilina region and set an appropriate pricing policy that would attract new potential customers.

Bargaining power of suppliers

AZ CAR has two important partnerships that ensure the supply of quality and affordable spare parts. One of the partners is Polcar PPH. Polcar PPH is a company operating in Poland and is one of the largest suppliers of individual body parts in Europe [14]. The second partner is the PROFIAUTO network of professional shops and car repair shops, which, like Polcar, supplies AZ CAR with quality and affordable spare parts for motor vehicles [14]. Suppliers do not pose a threat to AZ CAR, as AZ CAR has a wide range of options to buy from its suppliers and offers it to its customers, who have the right to choose a quality and affordable spare part.

4. Conclusions

Based on the obtained results, it can be stated that in terms of the division of the scope of companies by region, it can be seen that each region has a large number of companies that fall into the field of wholesale of parts and accessories of motor vehicles. Therefore, it is possible that there will be competition for customers between certain companies, which also creates a threat for companies in the form of bargaining power of buyers. Customers will choose the company primarily based on the price of goods sold and services provided. In the face of the threat of entry of new competitors, the situation is stable and it can be stated that in the foreseeable future companies do not plan to enter new markets and be a threat to established companies in the sector. The threat of substitute products and services is currently taken as a warning for the future, when citizens could make extensive use of forms of transport other than road transport, and the sale of spare parts for passenger cars would be slightly declining. The bargaining power of suppliers does not pose a threat to AZ CAR, as the company has strong partnerships that help it move forward in its business.

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THE POSITION AND COMPETENCES OF THE PRESIDENT OF A SELF-GOVERNING REGION IN SLOVAK REPUBLIC

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Abstract: *The paper deals with the president of the self-governing region, who was incorporated into the legislation of the Slovak Republic by Act no. 302/2001 Coll. on self-governing regions. The president of a higher territorial unit is one of the bodies of territorial self-government and through his position the inhabitants can participate in the administration of public affairs indirectly by choosing the best candidate in the elections. The aim of the paper is to analyze the current legislation and the position of the president of the self governing region in the legislation of the Slovak Republic, to point out the shortcomings and conflicts that could occur in his work, especially in his relationship with the regional council or other public positions. Last but not least, the aim is to propose possible solutions to the problems and therefore make the work of the president of the self-governing region in the Slovak Republic more effective.*

Keywords: *regional self-government, region, president*

1. Introduction

Regional self-government is an important part of territorial self-government and interferes in people's daily lives. The existence and functioning of higher territorial units (self-governing regions) is also confirmed by history. In the Slovak Republic, the higher territorial units were constituted as the basis of regional self-government and as an independent territorial self-government and administrative unit. The incomplete model of territorial self-government confirms that the absence of self-government of higher territorial units restricted the rational division of power between central and territorial self-government, encouraged bureaucracy and increased costs in public administration [1]. Without higher territorial units, it was not possible to build regional self-government and policy at the regional level assumes the existence of institutions that have the right to manage a substantial part of public matters. For political reasons and under the pressure of negotiation process on Slovakia's accession to the EU, which required a system of regional self-government in the candidate countries, the Slovak Republic adopted Act no. 302/2001 on the self-government of higher territorial units, which established 8 self-governing regions. Prior to the adoption of the said Act, an extensive amendment to the Constitution was carried out, supplementing and amending Title 4 of the Constitution of the Slovak Republic and therefore enabling the creation of higher territorial units as legal entities that manage their own property [2].

Regional self-government is implemented mainly through the bodies of the self-governing region, which include the council and the president. The president is the highest executive body of the region. The role of the president is mainly to administer the region to the best of his abilities and capabilities. On the other hand, his position is associated with certain problems that may prevent him in his mission. At the same time, the president of the region must have certain preconditions in order to be able to fully participate in the administration of the higher territorial units. Only such complex person can ensure the development and progress of the higher territorial unit that he or she has been chosen to lead and represent.

2. The position of the president of a self-governing region in the legislation of the Slovak Republic

The position of the president of a self-governing region is established by the Constitution of the Slovak Republic itself in Art. 69 par. 4 where it says that the bodies of the higher territorial units are the council and the president. The Constitution further in Art. 69 par. 6 defines the president of a higher territorial unit as the executive body of the higher territorial unit, who performs their administration and represents the higher territorial units externally. It can be deduced that the Constitution provides a legal basis for the position of the president and at the same time gives it a certain importance and a key role in the implementation of regional self-government. At the same time, the constitutional anchoring of the institute of the president of the self-governing region also ensures the protection of the right of the inhabitants to territorial self-government [3].

The president of the self-governing region is elected by the inhabitants of the self-governing region in general, equal and direct elections with a secret ballot for a term of office of 4 years. In connection with the election period, it is necessary to mention Constitutional Act no. 44/2017 Coll. supplementing and amending the Constitution of the Slovak Republic. The mentioned amendment, in the elections in 2017, extended once the term of office of the representatives of the self-governing region and the president of the region to 5 years. The intention of this amendment is to combine elections to the bodies of self-governing regions with elections to the bodies of local self-government (municipalities and cities). The Slovakian

legislators intend to save money and increase participation in elections to the bodies of self-governing regions, as this type of election has long been characterized by low participation. In the 2017 elections, participation reached 29.94%. This was historically the highest election attendance, but compared to the other elections in the Slovak Republic, it was below average. Until 2017, the regional elections took place in two rounds, while in the second round the participation was always lower than in the first round. In 2013, attendance reached 17.29% in the second round, and the lowest participation was recorded in the 2005 elections, when only 11.06% of all eligible voters took part in the second round [4]. Therefore, this amendment to the constitution is a good step towards raising awareness of self-governing regions. Whether the intention of the amendment was fulfilled will be seen as early as 2022, when the joint elections will take place for the first time.

The mentioned provisions of the Constitution of the Slovak Republic are implemented by Act no. 302/2001 Coll. on Self-Government of Higher Territorial Units, as amended. (after referred to as the "Act on Self-Governing Regions"). According to § 16 par. 11 of the Act on Self-Governing regions, the position of the president is a position of public interest and is not to be performed in an employment relationship. Therefore, the president of a self-governing region is not an employee of the region, but in addition to his position as president, his current employment relationship or similar employment relationship is maintained. In practice this means that after the termination of the position as a regional president, such person has the right to return to work with the employer, as the employment relationship does not end. This is also confirmed by the Labor Code, which defines holding of a public office as one of the obstacles to work and stipulates the obligation of the employer to release an employee for public office in the long term.

From the above it can be concluded that the president of the self-governing region has a strong constitutional but also legal status, which ensures the right of residents to exercise self-government. The legislator's efforts to address the low participation in the regional elections can also be considered positive. I think that the combination of local and regional elections is a good step to raise awareness of this form of self-government in the Slovak Republic, as it is still an institute that is not very well known among the population, which may be related to their relative youth, but also because that in some areas it does not have sufficient competencies or has shared competencies with the state and people often do not know it.

3. Competences of the president of the self-governing region

The competences of the president of a higher territorial unit is primarily regulated by the Act on Self-Governing Regions in § 16. According to the given paragraph, the president of a self-governing region:

1. is elected by the inhabitants of the self-governing region in direct elections
2. takes the oath of office
3. represents the self-governing region externally in property-law, labor-law and other relations determined by law. It also decides on matters in which the law entrusts a self-governing region with decisions on the rights and obligations of legal and individual persons.
4. may suspend the execution of the resolution of the council if he considers that it is in conflict with the law or that it is disadvantageous for the self-governing region
5. may not suspend the execution of a resolution which, after an initial suspension by the President, has been re-approved by a three-fifths majority of the council
6. convenes the chairs of the commissions once a month to discuss important issues of the self-governing region
7. responds to the interpellation of a council members orally at a meeting of the assembly or in writing within 30 days
8. determines the extent to which he will be represented by the Vice-Presidents

Upon taking office, the newly elected president shall take the oath, which reads: "I promise that I will properly fulfill my duties, protect the interests of the self-governing region, adhere to the Constitution of the Slovak Republic, constitutional laws, laws and other generally binding legal regulations and I will exercise them to the best of my knowledge and conscience. ". Without the oath, holding public office is not possible. The pledge expresses certain moral and ethical commitments that he must apply in relation to his constituents. I dare say that the law, through a oath, prescribes a certain form of behavior to the president and imposes on him the obligation to act only for the benefit of the self-governing region and its inhabitants. The importance of the pledge is also emphasized by the Act on Self-Governing Regions itself, as one of the possibilities for the termination of the term of office is to refuse to take the oath [5].

Holding a public office generally requires a person of high professional and moral qualities. This also applies to the president of the self-governing region, who with his expertise and knowledge should assert the needs of the region's inhabitants and ensure its development. In the duties of the president, it is necessary to mention Constitutional Act no. 357/2004 Coll. on the Protection of the Public Interest while holding a public office (referred to as the Constitutional Act on the Protection of the Public Interest). The president of a self-governing region is also considered a public official, and therefore there must be no conflict of interest. According to Art. 3 of the Constitutional Act on the Protection of the Public Interest, a conflict of interests occurs when a public official, in this case the president of a higher territorial unit, prioritizes personal interest over public interest. Such conduct is expressly prohibited by the Constitutional Act in Article 4, which stipulates that a public official (president of a self-

governing region) is obliged to enforce and protect the public interest while holding office and may not give priority to personal interests. It can therefore be stated that the office of the president of a self-governing region is also connected with the protection of the public interest. Furthermore, the President may not use his office to obtain advantages for his own benefit and for the benefit of his loved ones. He may not solicit gifts, induce others to provide gifts, or receive other benefits in connection with execution of his duties. Last but not least, he may not mediate for himself or a close person business relations with the state, a municipality, a higher territorial unit, a state enterprise and other entities stipulated by this act.

The office of the president of the self-governing region therefore requires a person with high professional knowledge and moral character, who will use his knowledge only for the benefit of the region. This is aided by the oath made by law, which he must take before taking office, but also by the obligation to enforce public interest, which is protected by a separate constitutional law. That is why it is necessary for the position of regional president to be performed by a person with high moral credit, who with his diligence, expertise and knowledge acts only for the benefit of the region

4. The relationship between the president of the self-governing region and regional council

The smooth cooperation between president and the council is an important element of the functioning of regional self-government. Within the competencies of the president, his relationship with the council is emphasized. In particular, the president convenes, directs and closes the meetings of the council meetings. It proposes the agenda of council meetings and makes budget changes determined by the council

The relationship between the president and the council in the field of norm-setting is important. Within 10 days, the president signs the generally binding regulations and resolutions adopted by the council. He may exercise the right of suspension against the resolutions of the council if he considers that the resolution is in conflict with the law or is disadvantageous for the self-governing region. The right of suspension shall be exercised in such a way that the president does not sign the resolution within 10 days of its approval by the regional council. The council can break the applied right of suspension within two months by re-approving it by a 3/5 majority of all council members. If the council does not do so, the resolution expires. The resolution approved in this way can no longer be suspended by the president. However, the president may not invoke the right of suspension against a resolution concerning the election and removal of the Chief Controller. This condition ensures that the post of Chief Controller is filled by a broader consensus of members of the regional council.

The problem may arise when the right of suspension has been breached and president still refuses to sign the resolution. According to the law president cannot suspend the execution of a resolution. However the law does not stipulate in its provisions how to proceed in a situation when president refuses to sign the resolution [6]. One possibility is that the resolution will simply be implemented without the signature of the president. In this case, it is necessary to emphasize the role of the Chief Controller, whose role is also to control the implementation of resolutions approved by the council. On the other hand, if the president decides not to sign the re-adopted resolution, there is no measure or sanction that could prevent him from doing so.

The relationship between the president and the council in the creation of functions is also important, especially in the election of vice-presidents of the self-governing region. The vice-presidents of the self-governing region are elected by the council from their members. Although the president proposes candidates, his selection is limited to members who have the chance to obtain majority support from the council. However, the president shall decide independently to what extent he shall be represented by the vice-presidents. Members' interpellations towards the president are another important element of cooperation between the council and the president. The Act on Self-Governing Regions stipulates the obligation of the president to respond to the interpellation, either orally or in writing. The time limit for a written reply is set at 30 days.
All of the above represents the principles of division of power between the bodies of the self-governing region and therefore the efficiency of the regional self-government is ensured. Manifestations of the division of powers include the power of the president to convene the chairmen of council commissions once a month to discuss important issues concerning the functioning of the self-governing region [7].

It can be deducted that the co-operation between the council and the president is necessary for the efficient and proper administration of the self-governing region. Last but not least, it should be mentioned that this cooperation may be endangered immediately after the regional elections. As the president is elected directly by the population, there may be a situation where the elected candidate is a representative of a party other than the majority in the council, or an independent candidate may be elected. Such situation after the elections can cause problems in the cooperation of the regional authorities, as with larger differences of opinion, consensus is much more difficult to find or no consensus will be reached at all. It can therefore be stated that political representation in regional authorities significantly affects their ability to cooperate

5. Incompatibility of the functions of the president of a self-governing region

All persons in public office have a certain power. The president of the self-governing region is no exception. The accumulation of a large amount of power in the hands of one person creates space for its abuse. To prevent the

accumulation of power in the hands of one person and the emergence of a conflict of interest, the Act on Self-Governing Regions regulates the institute of incompatibility of functions. According to §16 par. 10 of the Act on Self-Governing Regions, the office of the president is incompatible with the function of:

1. member of the self-governing regional council
2. a statutory body of a budgetary organization or a contributory organization established by a self-governing region
3. employee of the self-governing region
4. the mayor of the municipality or the mayor of the city
5. according to a special law

In case of incompatibility with the function of a member of the self-governing regional council - this is a logical provision, as there are two equivalent bodies at the regional level to control and cooperate with each other, so there can be no situation where one person holds both offices. It follows from the definition of incompatibility of functions that the president of a higher territorial unit cannot work in schools established by a self-governing region, as a statutory body in budgetary organizations in the field of transport, social affairs, health care, culture and many others. It is also important to mention the offices that the president of the region may not perform according to a special law. This is, for example, Act no. 154/2001 Coll. on prosecutors and legal trainees of the prosecution. According to §11 of this act, the office of the prosecutor is incompatible with the office in the bodies of territorial self-government. As the president of a self-governing region is one of the bodies of territorial self-government, it can be stated that the office of the president is incompatible with the office of the prosecutor [8].

The institute of incompatibility of functions is an important part of any public office and therefore deserves special attention. I think that the current regulation is insufficient and needs to be expanded. According to the valid legal regulation, it is not excluded that the president of a higher territorial unit also holds the position of a member of the Slovakian parliament. In practice, there have been cases where the same person held both of these elected positions, which brings several problems. First of all, any public office is time-consuming and labor-intensive. I believe that a person who holds office of the regional president and is member of the Slovakian parliament will either prefer one position over another or will neglect both, as any public office requires a person who will devote himself fully to it. Another problem that can arise in such case is a conflict of interest in voting, for example in the state budget or taxes. There may be a situation where the advantage in favor of a self-governing region may be preferable over the interests of other entities or society, which is in my opinion inadmissible as the president of the region, who is elected as a member of the Slovakian parliament, represents the interests of all citizens of the Slovak Republic. At the same time, it is not excluded that a member of the municipal council becomes the president of a higher territorial unit. Incompatibility with a senior employee of a state administration body should also be included in the legislation on the incompatibility of functions. In this case, it is possible to take an example from the Slovak Act on Municipal Establishment, which contains such provision which is related to a mayor of the city.

The incompatibility of the function of the president is an important part of his work. In particular, it prevents the accumulation of power in the hands of one person, a conflict of interests and ensures that the president of the region concentrates only on the duties arising from his office. It is therefore appropriate to recommend that the legislator should extend the definition of incompatibility of functions as mentioned above.

6. Conclusion

The president of a self-governing region represents an important part of territorial self-government, especially in protection of the regional interests, but also other public interests. However, the legislation of this institute contains some shortcomings that need to be addressed. First, it is necessary to legislatively anchor the procedure in a situation where the president refuses, after breaking the right of suspension, to sign the resolution. The law should prevent the existence of an enforceable resolution that the president refuses to implement or in any way unnecessarily prolongs its execution. One way to solve this situation at present is to go to court, but I think that solving this problem by court is disadvantageous for the self-governing region due to its duration or costs, and if the council and president are in constant conflict, such a solution is not possible in a long run. Another way to solve this problem is to call a referendum on the removal of the president. Given the referendum practice in the Slovak Republic and the fact that no regional referendum has been announced since 2001, it can be argued that even such solution is not practical in the long run. Attention is also required for the incompatibility of the function, which must be extended at least by an office of the National Council of the Slovak Republic. In conclusion, it is necessary to emphasize that the president of the self-governing region works for the benefit of the region and its inhabitants, therefore it is necessary to eliminate the mentioned shortcomings for the best performance of regional self-government.

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ISSUES OF TRADING COMPANIES AND THEIR BODIES IN THE LEGAL ORDER OF THE SLOVAK REPUBLIC

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Abstract: *The goal of the article is to analyze the legislation in the Slovak Republic in the field of issues of commercial companies and their bodies. We point out the importance of the institute of business companies for trade, economy and business not only in the Slovak Republic, but also in the European area. In this case, we deal with commercial companies in general and the basic sources of the legislation, personal and capital companies. Related to this is the issue of the creation of these bodies for individual types of companies. An important issue is the position of single-member limited liability companies and their bodies in connection with Directive 2009/102/EC of the European Parliament and of the Council of 16 September 2009 in the field of company law on single-member private limited liability companies (hereinafter the 2009 Directive/102/EC). We briefly analyze the subject of legal regulation in Directive 2009/102/EC of the European Parliament and of the Council, but within the implementation of its provisions into the legal order of the Slovak Republic they are subject to regulation primarily in the Commercial Code.*

Keywords: *Commercial companies, bodies of commercial companies, creation of company bodies, single-member limited liability company, Directive 2009/102/EC of the European Parliament and of the Council.*

1. Introduction

The legal order, in particular private law, serves primarily to achieve and protect individual interests. In addition to these interests, there are a number of other social interests and goals that can only be achieved by excluding an individual from his or her legal sphere and, in conjunction with a unilateral speech, devoting it to a purpose that is not subject to subsequent changes in his or her will. This process creates legal entities that have their own legal personality. In this context, corporations and foundations have been considered legal entities since ancient times. A corporation is an association of persons with a specific purpose, to which the law confers an independent subjectivity, different from the subjectivity of the associated persons. In legal theory, corporations are divided into public and private, although this division is of a political rather than a legal nature, because private corporations do not only serve the private interests of their members, and vice versa, this also applies to public corporations. The traditional public law corporations include the state, municipalities and associations, while private law corporations based on the norms of special commercial law include mainly commercial companies.[1]

Business companies have undergone a relatively long historical development and it can be said that in the conditions of contemporary Slovak society, which is based on the principles of parliamentary democracy, the rule of law and especially the market economy, we take the legal institute of business as a necessity and a matter of course. In the last 20th century, there was a relatively long period (1948 - 1989), in which companies in Slovakia, respectively, in the Czecho-Slovak republic did not figure, which was a consequence of the socio-political changes after 1948 and the nationalization or complete nationalization of the hitherto private companies. Business companies returned to the economy and especially to the Slovak legal system after 1989, respectively after changes in the state system and in the legal order took place mainly in 1990. The legal regulation of commercial companies is strategic for the company and optimally functioning market mechanisms and is currently gaining importance. Today, we can no longer imagine our society, economy, or business without the legal institute of commercial companies not only in the Slovak Republic, but also within the European Union or the world.

This is followed by a very important question of the position, competences and powers of the bodies of commercial companies, which are of particular importance for the life, but also the management of companies, from historical beginnings. Equally important is the question of the legal regulation of creation, respectively appointments or elections to the bodies of companies in terms of application practice. The current social order and practical problems increase the requirements for clarifying the legislation and defining the bodies of companies as such. The general requirement also applies to the prevention of deficiencies arising from a variety of practical application problems.

2. Business companies in general

In addition to natural persons, legal entities may also carry out business activities. In accordance with the valid Slovak legislation, commercial companies are legal entities established for the purpose of doing business, which is a legal definition contained in the Commercial Code valid in the territory of the Slovak Republic (SR).

[1] KUBIČEK, P. - MAMOJKA, M. - PATAKYOVÁ, M. : Obchodné právo, Bratislava: Univerzita Komenského v Bratislave, Právnická fakulta, p. 100 - 101

We do not find the very definition of a business company in the Commercial Code valid in the Slovak Republic, which is correct and logical, as given the differences between individual companies, a uniform definition of a business company would be inaccurate and without relevant informative value.[2]

The Commercial Code in the Slovak Republic regulates five commercial companies that can be established under Slovak law, namely a public trading company, a limited partnership, a limited liability company, a joint stock company and a simple company for shares. A limited liability company and a joint stock company may be established for other purposes, unless prohibited by special law.[3] In this context, we cannot forget the European society and the European Economic Interest Grouping, which have a status similar to that of commercial companies in the Slovak Republic, which follows from the Commercial Code. A simple share company can only be established from 1 January 2017, combining elements of a limited liability company and elements of a joint stock company in order to facilitate the entry of investors into the company in the form of lower share capital and greater flexibility in adjusting internal relations.

Legal entities established under European Union law have a status similar to that of commercial companies, which is effective in the territory of the Slovak Republic from 1 October 2004.[4] In this context, it is necessary to emphasize that the provisions of § 56 para. 1 of the Commercial Code, which contain an exhaustive calculation of the legal forms of commercial companies, are mandatory. On the other hand, e.g. in the Czech legislation according to the provisions of § 1 par. 2 of Act no. 90/2012 on commercial companies and cooperatives (Commercial Corporations Act) commercial companies are a public company and a limited partnership (hereinafter referred to as a partnership), a limited liability company and a joint stock company (hereinafter referred to as a capital company) and a European company and European economic interest companies. association. The Act states that societas europaea and the European Economic Interest Grouping, as legal entities established under the law of the European Communities, directly belong to companies in the Czech Republic, ie they do not only have a status similar to that of companies as stipulated by the Slovak Commercial Code.

"Under European Community law, different entities may arise. The legal regime of these entities is regulated primarily by regulations of the Council of Europe and the so-called implementing laws for those regulations. After their entry in our commercial register, they have a legal status similar to that of commercial companies in the Slovak Republic. The provisions on entrepreneurs and on the legal form of the company that is most similar to our legislation apply to the legal status of these entities."[5]

2.1 Personnel and capital companies and their bodies

This is not explicitly stated in the law, legal theory divides companies into personal (personnel) and capital.[6] Personal trading companies include both a public trading company and a limited partnership, and capital trading companies include a limited liability company, a joint stock company and a simple joint stock company. A limited partnership is sometimes referred to as a mixed company because it has elements of both types. Each of the above-mentioned legal forms of the company has its own regulation of its statutory bodies, resp. authorities in general, and this of course differs in the way they are created, whether by the action of these bodies, or by their actions on behalf of the company in individual types of business corporations.

Of particular importance in this respect is the issue of liability for the company's liabilities, while according to the provisions of § 56 par. 5 of the Commercial Code, a natural and legal person may be a partner with unlimited liability in only one company. The application of this legal principle aims to protect the creditors of companies. It is the scope of liability, which results from the very nature of commercial companies, in principle determines their division into personal and capital companies.[7]

A characteristic feature of personal companies is the unlimited solidarity of the partners' liability according to the form of the company. The unlimited liability partners are the partners of the public trading company and the general partners of the limited partnership. This also has an impact on the company's own bodies, as the characteristics of personal companies traditionally include the absence of their institutionalization and these companies are not required by law to create internal bodies. According to the Commercial Code, the business management of this type of company, as well as the external actions on behalf of the company, belong dispositively to all partners. The emphasis on the personal element of the company's participation is also reflected in the prohibition of a unipersonal company in a public company. On the other hand, the shareholders of capital companies are not liable for the company's liabilities for the duration of the company at all, which applies to a joint-stock company, or only to a limited extent for a certain period of time, which is characteristic of a limited liability company. On the other hand, capital companies, unlike personal companies, are required by law to make a contribution to the company. The position of commercial companies is generally characterized inter alia by a prohibition on the abuse of the

[2] STRAPAČ, P. a kol. : Orgány obchodných spoločností a družstva, Bratislava : Eurounion, spol. s r. o., 2013, p. 21
[3] § 56 par. 1 of Act no. 513/1991 Coll. Commercial Code
[4] § 56 par. 2 of the Commercial Code
[5] PATAKYOVÁ, M. a kol. : Obchodný zákonník. Komentár. 3. vydanie, Praha : C . H. Beck, 2010, p. 157
[6] Unlike the Czech legislation, where Act no. 90/2012 Coll. on Commercial Companies and Cooperatives (Act on Commercial Corporations) determines the allocation to personal and capital companies directly in its provisions in § 1 para. 1
[7] KUBIČEK, P., MAMOJKA, M., PATAKYOVÁ, M. : Obchodné právo, Bratislava : Univerzita Komenského v Bratislave, Právnická fakulta, 2010, p. 103

shareholder's rights, in particular the abuse of a majority or a minority of the company's votes, and any conduct which disadvantages any of the shareholders in an abusive manner is prohibited.[8]

Unlike partnerships, where their institutionalization is not envisaged and the actual creation of bodies depends on the agreement of the shareholders in the partnership agreement, in the case of capital companies, bodies are created compulsorily, which follows directly from the provisions of the Commercial Code. In the case of a limited liability company, the obligatory body is the general meeting and the managers, while the supervisory board is not created obligatorily. In the case of a joint-stock company, the obligatory body is the General Meeting, the Board of Directors and the Supervisory Board.[9]

2.2 Bodies of trading companies in legislation

The basic source of Slovak legislation of companies and their bodies is Act No. 513/1991 Coll. Commercial Code as amended. In addition to the Commercial Code, the basic sources of the legal regulation of trading companies also include Act no. 40/1964 Coll. Civil Code (hereinafter referred to as the Civil Code). Act no. 530/2003 Coll. on the Commercial Register as amended, Act no. 7/2005 Coll. on Bankruptcy and Restructuring and Act no. 455/1991 Coll. on Trade Licensing, the provisions of which also include the legal regulation of trading companies.

A European grouping of economic interests as a legal person may be set up under Council Regulation (EEC) No. 2137/85 of 25 July 1985 on the European Economic Interest Grouping. In the Slovak Republic, it is also regulated by Act no. 177/2004 Coll. on the European Economic Interest Grouping, amending the Income Tax Act. The European Economic Interest Grouping (hereinafter also the Grouping) is a legal entity created by registration in the Commercial Register.

The legal status of European companies (societas europaea) with registered office in the Slovak Republic, which are legal entities and are created by registration in the Commercial Register and some other legal relations related to the establishment, change, dissolution and management of a European company is regulated by Council Regulation (EC) of 8 October 2001. no. 2157/2001 on the Statute of the European Company and Act no. 562/2004 on the European Society (hereinafter referred to as the European Society Act) and on the amendment of certain laws.[10]

The statutory body of the Grouping is one or more managers. The manager must meet the conditions according to a special regulation, t. j. Council Regulation (EEC) No 2137/85. The provisions of a special regulation (Commercial Code) governing the position and responsibilities of the executives of a limited liability company shall apply mutatis mutandis to the position and responsibilities of the executives of the Group.[11]

The European Company Act distinguishes between a two-tier and a one-tier system from the point of view of the authorities in the administration and management of a European company. The two-tier system designates the company's board of directors and supervisory board as the company's bodies. In a one-tier system, the board of directors is the statutory body of a European company, which manages the activities of the European company, determines the fundamental intentions of its business, supervises their implementation and acts on its behalf. The Board of Directors decides on all matters of the European Company, unless they are a special regulation (Council Regulation/EC/ No. 2157/2001), the European Company Act, or the Statutes of the European Company entrusted to the General Meeting or the Executive Directors.[12]

Company bodies are a current topic in legal theory as well as application practice. As far as the statutory bodies of trading companies are concerned, the regulation is contained in both mandatory and a number of dispositional provisions. In principle, this provides sufficient scope for the variability of their scope, as well as the rights and obligations of the company's statutory body. The rich case law of the Supreme Court of the Slovak Republic and the Supreme Court of the Czech Republic is also an important source.

Legal theory deals mainly with the statutory bodies of capital companies, which results from their more frequent occurrence. Statutory bodies have relatively sufficient legal regulation, as well as it is broadly elaborated in legal theory. This cannot be said entirely about the regulation of personal companies, which in Slovak legal conditions have essentially a brief and general definition, which does not always help practical business through these forms of companies. The question arises as to whether a broader treatment of this issue would not be a more ideal solution.

3. Specific issues of single-person companies and their bodies

An important issue is the position of single-member limited liability companies and their bodies in connection with Directive 2009/102 / EC of the European Parliament and of the Council of 16 September 2009 in the field of company law on single-member private limited liability companies (hereinafter the 2009 Directive). / 102 / EC). Single-person companies with r. about. on the one hand, they are subject to the legal regulation of Directive 2009/102 / EC of the European Parliament and of the Council, but within the framework of the implementation

[8] Ibid., p.116
[9] STRAPAČ, P. a kolektív: Orgány obchodných spoločností a družstva, Bratislava: Eurounion, spol. s r. o., 2013, p. 27
[10] PATAKYOVÁ, M. a kol.: Obchodný zákonník. Komentár. 3. vydanie, Praha: C . H. Beck, 2010, p. 157
[11] § 5 of Act no. 177/2004 Coll. of the European Economic Interest Grouping Act
[12] § 20 to § 22 of Act no. 562/2004 on European society

of its provisions into the legal order of the Slovak Republic they are subject to the regulation primarily in the Commercial Code.

Directive 2009/102 / EC of 16 September 2009 replaced the twelfth Council Directive 89/667 / EEC, as amended several times, in the field of company law of 21 December 1989 on single-member private limited liability companies ('Directive 89/667 / EEC) and entered into force on 21 October 2009. The original Directive was frequently supplemented, which required the adoption of a new version of the Directive. Although Directive 2009/102 / EC replaces the acts subject to codification, it has at the same time fully preserved the content of the acts codified so far and, in fact, merely consolidates them.

Directive 2009/102 / EC is a harmonization tool bringing standardization and unification of characteristic elements of single-person, resp. single-member companies, not only in the case of limited liability companies. It enshrines the basic institutes and principles governing the establishment of a one-member company, the position of the highest body, or the conclusion of contracts between a single partner and the company itself. The aim of both directives was at the same time to remove the obstacles imposed by some Member States on the establishment and existence of a limited liability company with one founder or shareholder.

Both directives were primarily intended to address cross-border company formation, but they did not achieve real harmonization in this area of law, as the individual transpositions of the Member States were different, as was the legislation itself. Just as before the adoption of these directives in some Member States of the European Union it was not possible for domestic and foreign entities to set up a single-member limited liability company, one-member founders are now excluded from this option, including foreign founders in states limited liability.[13]

In addition to a one-person company, the directive also applies to a one-member joint stock company. According to Article 6 of Directive 2009/102/EU, if a Member State authorizes a sole member company as defined in Article 2 par. 1 also in the case of public limited liability companies, this Directive shall apply to them. Directive 2009/102/EU does not directly oblige EU Member States to introduce into legislation the possibility of so-called a single-member public limited-liability company, but if a Member State authorizes a single-member company also in the case of a public limited-liability company, this Directive will apply to it.[14]

From the point of view of the creation of company bodies, the so-called single-person trading companies. Commercial companies are associations of natural and legal persons, as well as associations of natural and legal persons, or, in the case of single-person companies, are in fact not associations at all. "In principle, the law requires that at least two persons be the founders of a company. An exception is a limited liability company, which may be established by one founder. A joint stock company may be established by one founder, if the founder is a legal entity (§ 162 para. 1 of the Commercial Code). "These specifics have a fundamental influence in the decision-making of a single shareholder, which, in the case of single-member limited liability companies, consists of only one shareholder. In such a case, in essence, the general meeting does not take place, because the sole shareholder decides independently. This was also reflected in the legislation in the Slovak Republic, where the decisions of the sole shareholder taken in the exercise of the powers of the General Meeting must be in writing and must be signed by the shareholders.

According to Article 4 of Directive 2009/102 / EU, the sole member exercises the powers of the general meeting of the company. Decisions taken by the sole member in the area referred to in paragraph 1 shall be recorded in the minutes or otherwise in writing. In this context, the legal order of the Slovak Republic goes beyond the scope of Directive 2009/102 / EU. According to the provisions of § 132 of Act no. 513/1991 Coll. Of the Commercial Code, as amended, if the company has a single shareholder, this shareholder performs the powers of the General Meeting. The decision of the sole shareholder made during the exercise of the powers of the General Meeting must be in writing and must be signed, unless otherwise provided by this Act. If it is a decision according to § 125 par. 1 letter e), f), i), j) and par. 2, the authenticity of the signature of the sole shareholder on this decision must be officially certified. Contracts concluded between a company and its sole partner, if that partner acts simultaneously on behalf of the company, must be in writing.

4. Conclusion

Commercial companies have undergone a relatively long historical development and it can be said that in the conditions of contemporary Slovak society, which is based on the principles of parliamentary democracy, the rule of law and especially the market economy, we take the legal institute of business as a necessity and a matter of course.

Today, we can no longer imagine business relationships without the existence of companies that have a clear dominance in this area, even if other businesses are involved in business, such as sole proprietors, who are natural persons, or state enterprises, which are legal entities as well. as trading companies. State-owned enterprises, according to their name, fall within the sphere of state management and are explicitly state-owned.

The bodies of companies represent the basic driving force associated with the number of rights, obligations and subsequent responsibilities of its members, while in each company these bodies are created differently and the

[13] DĚDIČ, J., ČECH, P.: Znovu k zákazu rětězení společností s ručením omezeným, Právní rozhledy, 2005, Year 13, no. 20, p. 747

[14] PELIKÁNOVÁ, I., ČERNÁ, S. a kol.: Obchodní právo. Společnosti obchodního práva a družstva. II. part, Praha: ASPI, a. s., 2006, p. 224.

responsibilities of the members of these bodies are different.

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[8] §5 of Act no. 177/2004 Coll. of the European Economic Interest Grouping Act
[9] § 20 to § 22 of Act no. 562/2004 on European society

PRIVACY AND PERSONAL DATA PROTECTION ISSUES AS REGARDS THE USE OF COOKIES ON THE EXAMPLE OF HEALTHCARE PROVIDERS IN SLOVAKIA

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Abstract: *This paper examines the application of the cookies' regulation, specifically as regards the legal requirements stipulated by legislation and further developed by case law, the fulfilment of which ensures the lawful employment and use of cookies towards users visiting different websites on the internet. The implementation of these legal requirements in practice is analysed on the example of websites operated by different healthcare providers within the territory of the Slovak republic, which utilize cookies for different purposes. In this regard the authors identify the common practice of healthcare providers as regards the use of cookies on their websites and the main issues that prevent the successful implementation of the regulation in practice.*

Keywords: *privacy, personal data, cookies, healthcare providers*

1. Introduction

The existence of specific challenges and threats to the protection of fundamental rights and freedoms of natural persons on the internet, specifically of the right to privacy and personal data protection, cannot be refuted.

Data collection may be executed in numerous ways. One of the most common methods is based on the use of cookies, which are defined as the state of information that passes between an origin server and user agent and is stored by the user agent [1]. In general, cookies are small data or text files that are employed at the time when users visit websites by their servers with the objective to collect selected information and send this information back to these servers.

The issue to be tackled in this regard is the fact that the information collected may either include personal data of the websites' users, therefore possibly interfering with their right to personal data protection, or may in other way interfere with their personal life with the possibility to infringe users' right to the protection of their privacy. Due to the importance of privacy and personal data protection in the digital environment, the use of cookies and other similar technologies is limited by the applicable legislation supported by the relevant case law. This paper follows primarily the regulation enacted by the European Union (hereinafter only as the "EU"), which includes primarily the ePrivacy Directive [2] and the General Data Protection Directive [3], and the relevant case law of the CJEU contained primarily in the judgement C-210/16 Wirtschaftsakademie Schleswig-Holstein [4] and the judgement C-673/17 Planet 49 [5].

2. Related works

Kosta [6], Borgesius [7] and Markou [8] provide a critical legal analysis of the 2009 amendment to Article 5 (3) of the ePrivacy Directive that altered the approach as regards the provision of consent from the previously applied opt-out principle to the newly preferred opt-in principle. Cofone [9] further examines the different approaches of the selected Member States (UK and Netherlands) to the implementation of this amendment in their national legislation. The impact of the recent General Data Protection Regulation on the use of cookies in practice, specifically as regards the issue of consent provision, and the initiatives of the EU in connection with the further modification of the ePrivacy Directive are investigated by Rózenfeldová et al. [10]. The issue of consent provision and its obtainment from the perspective of business companies is also analysed by Jackson [11]. The legal analysis of the relevant CJEU case law on the use of cookies from privacy and personal data protection perspective is provided by Rózenfeldová [12]. Large-scale empirical study of web cookies was realised by Cahn et. al. [13]. The authors collected over 3.2 million cookies from the top 100.000 Alexa websites within the period of 18 months. On this basis the authors discuss important privacy implications by examining specific cookie attributes and placement behaviour of the third-party cookies. The Cookiepedia [14] provide the Cookiepedia database that currently contains 31 250 808 cookies that are categorized into four different categories, namely strictly necessary cookies, functionality cookies, performance cookies and targeting or advertising cookies, and also provides a tool to scan the content of websites to detect cookies used on them.

3. Methodology

The primary research question for the analysis provided is stipulated as follows: "How do healthcare providers in the Slovak republic approach the issue of privacy and personal data protection as regards the use of cookies on their websites towards their users?" The authors consider the individual legal requirements stipulated by the EU legislation and supported by the relevant case law of the CJEU and their implementation in practice. The authors examine these legal requirements and study their application or the absence thereof on the websites operated

by healthcare providers that provide their services within the territory of the Slovak republic.

The healthcare providers examined include both state-owned and operated institutions, as well as organizations managed by private companies. The list of healthcare providers was formulated on the basis of the National Registry of Health Care Providers administered in accordance with the Act No. 153/2013 Coll. on the National Health Information Centre [15], which defines e. g. the scope of data included in the registry, particularly information enabling the identification of subjects authorized to provide healthcare services in the Slovak republic.

To answer the above-stated research question, the authors conducted the analysis of all of the websites provided and operated by the identified healthcare providers in the Slovak republic.

The analysis included the examination of 95 websites in total, from which only 77 were identified as functionable and therefore were included in the analysis. Moreover, 5 more websites were later excluded from the analysis due to the fact that no cookies were employed on them. Therefore, 72 websites of the Slovak healthcare providers in total formed the basis for the authors' final analysis.

The analysis included the collection of numerous attributes defined with the objective to answer stipulated partial research questions. The relevant data was collected from the healthcare providers' websites, specifically from two sources, namely from the so-called 'cookie banners' (notifications shown on the website informing the user about the employment of cookies on the website) and from the cookies policies available on the website.

The first set of data, the objective of which is the examination of the method of consent provision, included the following data: (I) whether the user has the possibility to consent with the use of cookies (attributes: yes / no); (II) whether the user has the possibility to actively consent with the use of cookies (the application of the opt-in principle) (attributes: yes / no); (III) whether the user has the possibility to choose between different consent settings (e. g. consent provided for the use of all categories of cookies or only for the selected categories of cookies) (attributes: yes / no); (IV) whether cookies were applied notwithstanding the provision of consent, namely whether cookies were used even before the provision of consent (attributes: yes / no); (V) if cookies were applied notwithstanding the provision of consent, what types of cookies were employed, namely whether these cookies were limited to first-party cookies (attributes: yes / no).

The objective of the second set of data is to study the individual aspects that must be present to ensure the provision of an informed consent. In this respect, the authors examined, whether the following data was provided to users: (I) general information about cookies (attributes: yes / no); (II) information on the types of cookies used by the website (attributes: yes / no); (III) information regarding the purpose of cookies' use (attributes: yes / no); (IV) information specifying the scope of the data collected (attributes: yes / no); (V) information about the time period, within which cookies are used (attributes: yes / no); (VI) information about the parties with access to data collected by cookies (attributes: yes / no); (VII) specification of countries, to which data is sent (attributes: yes / no); (VIII) information about the controller (attributes: yes / no); (IX) information about the data protection officer (attributes: yes / no).

4. Consent as the authorization criterion

The utilization of data collected and processed with tracking technologies such as cookies can provide numerous benefits to different subjects. These include not only websites' operators, but also individual users of their websites. However, to ensure the conformity of such collection and processing of data, whether personal or other, with the applicable legislation and case law, the websites' operators must identify the relevant legal requirements and adhere to them in their practice.

The legal basis that provides the necessary authorization for the accumulation and processing of data in this regard is consent. The determination of consent as the authorization criterion is based on the provisions of the relevant legislation applicable in this regard, namely on Article 5 (3) of the ePrivacy Directive and, after the relatively recent modification of personal data protection legislation, on Article 6 (1) (a) of the General Data Protection Regulation (hereinafter only as "GDPR").

Consent as the legal basis for data processing is defined in Article 4 (11) of GDPR as "any freely given, specific, informed and unambiguous indication of the data subject's wishes by which he or she, by a statement or by a clear affirmative action, signifies agreement to the processing of personal data relating to him or her." This definition and the subsequent provisions of GDPR regarding consent together with the relevant case law of the CJEU determine the individual legal requirements to be fulfilled in order for the provision of consent to be considered as valid.

The most important condition in this regard is the requirement of lawfulness. According to Article 6 (1) of GDPR, "processing shall be lawful only if and to the extent that at least one of the following applies: a) the data subject has given consent to the processing of his or her personal data for one or more specific purposes." However, the provision of consent by the data subject (the affected natural person) for one or more specific purposes with the use of cookies on the website must fulfill certain conditions. Especially important is the obligation of controllers (website operators) to ensure that data subjects not only have the possibility to consent with the use cookies, but are also able to consent in an active manner. Active consent presents the application of the currently preferred opt-in principle in practice, which requires users

to actively 'do something' to provide their consent, as opposed to the formerly accepted opt-out principle that presumed the provision of consent until users submitted or otherwise expressed their objection in this regard.

The provision of active consent seems to be one of the most problematic conditions to be exercised in practice. Many websites actively try to circumvent this demand or otherwise trick users into providing their consent with the use of cookies. Examples of such practices include general formulations according to which users consent with the use of cookies simply by visiting a website (without the need to actively consent), by providing pre-checked checkboxes in cookies notifications, which users must deselect to refuse their consent, or by highlighting 'the accept buttons' while limiting the visibility of or otherwise hiding 'the deny buttons' in cookies notifications.

4.1 The lawfulness of consent provision

The analysis confirmed the above-stated issues regarding the lawfulness of consent's provision on the websites of the analysed healthcare providers. In this regard, the first partial research question was defined as follows: "Does the method of consent provision applied on the healthcare providers' websites fulfil the condition of lawfulness in accordance with the applicable legislation and case law?" To answer this question, the authors investigated four issues.

Firstly, we considered, whether users visiting the websites of the healthcare providers had the ability to consent with cookies used on these websites. In this regard, from the 72 websites that form the basis for our analysis, only 9 of them employed a mechanism for consent's provision.

Secondly, we investigated whether users were able to provide their consent with the use of cookies in an active manner, e. g. by clicking on the accept button. From the 9 websites that employed some form of mechanism for consent provision, almost all of them (8 out of 9) conformed to the condition of the active consent provision. The reason for this may be that fact that when websites' operators realise the fact that the provision of users' consent is necessary, and therefore a mechanism for consents' provision must be created, they employ such a mechanism that adheres to the applicable legislation and case law that requires the provision of active consent.

Thirdly, the authors considered whether the user, that has the possibility to consent with the use of cookies, also has the opportunity to choose between different consent settings. Such an opportunity may be present in the creation of different categories of cookies used on a website (e. g. strictly necessary, functional, analytical, advertising or other types of cookies). In this regard, website operators may enable users to consent only with all types of cookies employed on their websites, or may provide users the option to choose the categories of cookies with the use of which they consent to. The authors consider that from the legal point of view, the latter option better suits the legal requirement, according to which consent for personal data processing shall be given for one or more specific purposes. This conclusion is based on the fact that users' general consent with the employment of all categories of cookies may not be deemed as distinct enough to ensure the specificity of processing' purposes. The authors' analysis demonstrates these issues, as only 6 from the analysed websites enabled users to determine the categories of cookies, with the use of which they consent to, whereas 66 of websites did not provide this option to their users.

Fourthly, the authors analysed the question, whether cookies were employed (e. g. stored in users' terminal equipment) notwithstanding the provision of consent. In this regard the authors examined, whether cookies were engaged also in the incognito mode of web browsers.

The engagement of cookies before the obtainment of users' consent with the use of cookies is, at first sight, in conflict with the principle of lawful processing of personal data, due to the absence of a legal basis that authorizes such processing. Our analysis has shown that the majority of the analyzed websites (69 from 72 websites) used cookies even before any consent was provided from users. These results may indicate that the website operators do not condition the use of cookies on the provision of consent. This conclusion is supported by the fact that in the case of 60 websites that used cookies before the provision of consent, no mechanism for consent obtainment was provided, and in the case of the remaining 9 websites, that implemented such a mechanism, none of them ensured the non-employment of cookies before consent provision.

In conclusion, the answer to the first partial research question of whether the method of consent provision applied on the healthcare providers' websites fulfils the condition of lawfulness in accordance with the applicable legislation and case law must be (with minor exceptions) no. As was stated above, the majority of the analysed websites do not provide any mechanism for consent provision. From those websites that provide such a mechanism, only 8 websites in total fulfilled the requirement of active consent provision and only 6 websites provided the users with the possibility to choose between different categories of cookies to consent to and therefore ensured the provision of specific consent. Furthermore, the majority of websites did not condition the use of cookies on the consent provision (on average 5 cookies were used on every website before the provision of consent). Despite of the fact that some websites provided a mechanism for consent provision, none of them ensured the non-employment of cookies before obtaining such consent.

4.2 The possibility to withdraw consent

Article 7 (3) of GDPR also conditions the validity of consent's provision on the right of data subjects that previously provided their consent with data processing to

withdraw their consent at any time. Therefore, the authors stipulated their third partial research question as follows: "Do healthcare providers ensure the application of the right to consent withdrawal as regards the use of cookies on their websites?"

In this regard, the authors considered, firstly, whether the analyzed healthcare providers informed their users about their right to withdraw their previously provided consent with the use of cookies. This obligation is stipulated directly in Article 7 (3) of GDPR (2016), according to which data subjects shall be informed of this right "prior to giving consent". Despite of the clear wording of the regulation, the authors identified only 21 websites that provided their users with this information in contrast with 51 websites that did not contain such information. Therefore, more than 70 % of the analyzed healthcare providers were identified as directly infringing the applicable regulation in this regard.

Secondly, the authors examined whether it was possible for users to withdraw their consent directly on the website, on which the consent was previously provided. In this regard, only 2 websites provided such an opportunity. Specifically, one website enabled the consent withdrawal through an email and the other website provided this option directly in the cookies' notification.

The availability of the option to withdraw consent to websites' users may be difficult to ensure in practice, if specific methods for consent withdrawal are to be created for individual websites. This is supplemented by another legal requirement stipulated in Article 7 (3) of GDPR (2016), according to which "it shall be as easy to withdraw as to give consent," which can be interpreted as the possibility to withdraw consent in the same or similar manner as it was provided (e. g. if consent was provided by clicking on the accept button, the withdraw button should also be made available). In this regard it may be preferable for the website operators to provide their users with information regarding the possibility to delete cookies directly from their web browsers rather than to create specific mechanisms for consent withdrawal.

5. Conclusion

This paper discusses the issues connected with the use of cookies as regards the privacy and personal data protection of users visiting websites operated by healthcare providers in the Slovak republic. The authors focused predominantly on the individual aspects of consent provision that has been identified as the primary legal basis for the collection and processing of users' data through cookies. The results of the analysis conducted on the healthcare providers' websites confirm the absence of a common approach to consent provision and highlights the individual deficiencies of consent obtainment, such as the absence of a specific mechanism for consent provision, non-fulfilment of conditions required for the provision of informed consent, as well as the absence of consent withdrawal mechanisms required by the applicable legislation. In this regard, the authors conclude that the websites of the analysed healthcare providers that provide services in the Slovak republic do not sufficiently ensure privacy and personal data protection of their users, whose personal or other data may be collected and processed in a way that does not correspond to their interests.

Acknowledgements

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DEVELOPMENT OF AIR SEPARATION UNIT (ASU) MODEL FOR OXYGEN PRODUCTION

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Abstract: *Oxygen is one of the most important technical gases used in industry. Therefore, its production has to be as efficient and cheapest as possible at sufficient purity of the final product. Several processes can be used for oxygen separation from air. In this work, cryogenic separation of air was investigated, while air was approximated as a three-component mixture of nitrogen, oxygen, and water vapor. A unit processing 30 tons of air per hour ensuring the purity of the final product of 95 % vol. was designed. First, a suitable method for water vapor removal from air was proposed, and the compressor power input was calculated. Heat exchanger duties and specific power consumption for oxygen separation were also determined in this work. The obtained results indicate a substantial potential for improvement and, thus, plat layout and performance optimization were set as a long-term goal.*

Keywords: *air separation, oxygen, cryogenic technology, power input, process model*

1. Introduction

Oxygen is the second most used gas in industry. It is used in food, chemical, oil industry, pharmacy, and in the production of metals, paper, and others, with varying purity, state, and quantity requirements. The global oxygen market was worth $37.93 billion in 2019. It is expected to grow at a compound annual growth rate (CAGR) of 11% and reach $59.17 billion by 2023 [1]. In 2019, Future Market Insights (FMI) reported that overall sales of industrial oxygen reached approximately 380 million tons in 2018 [2]. To separate individual components of air, most air must be liquified. Gas can only be liquified at temperatures and pressures below its critical point; critical point of air is at T_c = 132.5 K and pressure P_c = 37.7 bar. Two liquefaction cycles are known, namely Linde and Kapica cycle. There are two different ways of producing oxygen: non-cryogenic and cryogenic production route. Non-cryogenic separation methods are used only for the separation of oxygen and nitrogen. These methods include membrane processes and pressure swing adsorption, both operated at ambient temperature. Lower purity and flowrates of gases are achieved but the processes are flexible and can be cyclic or a rapid load change can be applied. Therefore, they are used in batch processes and smaller-scale enterprises mostly.

1.1 Cryogenic Air Separation

Cryogenic separation method is based on different boiling points of mixture components. This method was invented by Carl von Linde and was first used in industry in the 20th century. Since then, several improvements have been introduced; however, it still can be upgraded. It is used for the separation of oxygen, nitrogen, and neon. Distillation columns used for the separation are placed in "cold boxes'' where the temperature is very low. The purity of obtained gases is about 99.9 %. It is the most effective technique when a large amount of oxygen is needed for the lowest price. Thermodynamic minimal work of oxygen separation from air is equal to 53.1 kWh per ton of oxygen. In 2015, the most efficient ASU (air separation unit) exceeded the minimum energy three times [3].

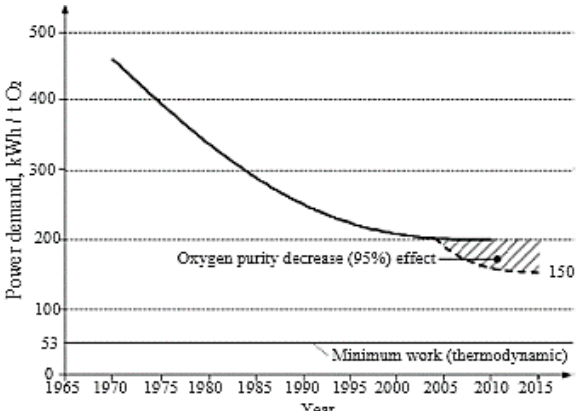

Figure 1: Energy consumption for the separation of one ton of oxygen over the last 55 years [3]

Individual air separation methods are summarized in Table 1.

Table 1: Air separation methods comparison [3]. M = Mature, RP = Research phase

Technology & development stage	*O_2 purity, %*	*Capacity, tons per day*	*Energy demand, kWh/ ton O_2*
Cryogenic (M)	99 +	up to 4000	200
Adsorption (M)	95 +	up to 300	500
Polymer membrane (M)	~ 40	up to 20	Low O_2 purity
Membrane (RP)	99 +	laboratory scale	400

Energy consumption decreases with the increasing capacity of ASU. As ASU capacities increase, cold losses from the equipment to the environment are reduced. This phenomenon is called the effect of scale. Figure 1 shows the development of the specific power demand over the decades.

1.2 Study Objectives

Several goals are defined in this work. The first one is to design a process scheme based on literature research. The system is described using material and enthalpy balances. The first assumption is the possibility to model oxygen-nitrogen mixture phase equilibrium adopting ideal mixture behavior. Data for the ideal mixture are calculated using the Raoult's law and real equilibrium data are obtained by the Peng-Robinson thermodynamic model in AspenPlus software. For both options, x-y equilibrium diagrams were constructed, and the number of theoretical stages required was determined using the McCabe-Thiele method. Another goal is to calculate the splitting ratio of the streams leaving the adsorber as well as the specific power input of the plant. The long-term goal is the optimization of the whole system.

2. Materials and Methods

The designed scheme can be divided into three sections. The first section, shown in Figure 2, provides air compression and water removal. In this work, air is considered as a three-component mixture composed of nitrogen, oxygen, and water vapor. Due to the process layout, it has to be compressed to the pressure of 6 bar which is done by two-stage compression, with an intercooler and final cooler, both serving as partial condensers of water vapor at the same time. The rest of the water vapor is removed in an adsorber. Air leaving the adsorber is divided into two streams, in a ratio to be estimated.

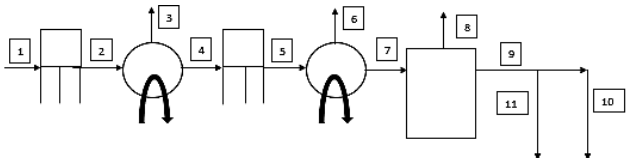

Figure 2: Compression section and water removal

Both streams enter the main heat exchanger, where they are pre-cooled by process effluents, see Figure 3. The smaller fraction of air proceeds through the expander, where it expands to the pressure of 1.5 bar and flows to the upper column. The second stream flows directly to the lower column.

The third section, as depicted in Figure 4, includes a separation column and a secondary heat exchanger. The column consists of a low-pressure column (LPC) which is the upper column, and a high-pressure column (HPC). Condenser of nitrogen vapors in HPC serves as the LPC reboiler. A part of the condensed nitrogen is used as a reflux for HPC. The main product is oxygen, obtained in the lower part of LPC. Liquid oxygen is drained directly, while oxygen proceeds to the main heat exchanger and is drained after recuperating cold to the inlet streams. The secondary heat exchanger serves as a pre-cooler for streams that serve as refluxes for LPC.

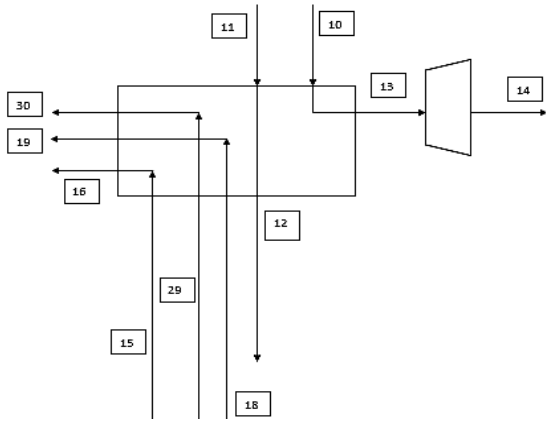

Figure 3: Main heat exchanger and air expander

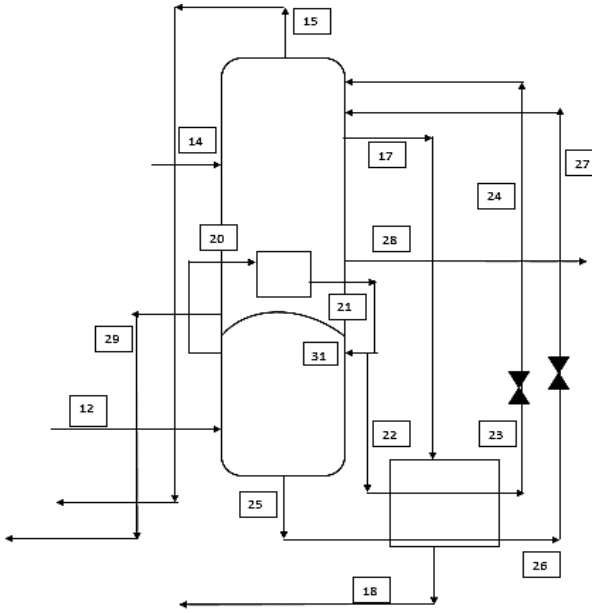

Figure 4: Air separation column and secondary heat exchanger

The gas-liquid phase equilibrium of air as ideal mixture is calculated by the Raoult's law and that of air as real mixture is calculated by the Peng-Robinson equation. Non-ideal mixture can be assessed by determining the activity coefficients of individual components, γ_i, using the equilibrium relation (1), which includes the Dalton's and Raoult's law

$$P \cdot y_i = \gamma_i \cdot P_i^{\circ} \cdot x_i \quad (1)$$

where, P is the total pressure of the system (Pa), P_i° is the saturated vapor pressure of component *i* (Pa), *x* is the mole fraction of the more volatile component in the liquid phase, *y* is the mole fraction of the more volatile

component in the gas phase. Saturated vapor pressure is calculated at the average temperature in both LPC and HPC using the Antoine equation.

The first section involving compression and removal of water vapor is calculated by a set of equations. Mass flow of dry air, $\dot{m}_G$, is calculated by equation (2)

$$\dot{m}_G = \frac{\dot{m}_1}{1 + \bar{Y}_1} \tag{2}$$

where, $\dot{m}_1$ is the mass flow of air (kg.h^{-1}), and $\bar{Y}_1$ is the relative mass fraction of water vapor (kg.kg^{-1}). Since air is compressed by two-stage compression, it is necessary to estimate the optimal pressure ratio, β, employing equation (3)

$$\beta = \sqrt{\frac{P_{fin}}{P_0}} \tag{3}$$

where, P_0 is the initial pressure (Pa), and P_{fin} is the final pressure (Pa). Relative mass fractions of water vapor are calculated by equation (4)

$$\bar{Y} = \frac{0.622 \,.\, P_G^{\circ} . \varphi}{P - P_G^{\circ} . \varphi} \tag{4}$$

where, φ is relative humidity. The first portion of water, condensed out of air is calculated from equation (5):

$$\dot{m}_3 = \dot{m_G} \,.\, \left(\bar{Y}_1 - \overline{Y_4^{rovn}}\right) \tag{5}$$

where, $\dot{m}_3$ is the mass flow of condensed water (kg.h^{-1}), and $\overline{Y_4^{eq}}$ is the equilibrium relative mass fraction of water vapor (kg.kg^{-1}). Compressor power input is calculated by equation (6)

$$P_n = \frac{R \cdot T \cdot \left(\frac{m_G}{M_G} + \frac{m_G \cdot \bar{Y}}{M_{H_2O}}\right) \cdot \frac{n}{n-1} \cdot \left(\beta^{\frac{n-1}{n}} - 1\right)}{\eta_c} \tag{6}$$

where, R is the molar gas constant (8.314 J.mol^{-1}.K^{-1}), T is temperature (K), M_G is the molar mass of dry gas (kg.mol^{-1}), M_{H_2O} is the molar mass of water (kg.mol^{-1}), n is the polytropic coefficient, and η_c is the overall compression efficiency.

Most data needed for enthalpy balance are obtained from Perry's Chemical Engineers' Handbook [6]. For enthalpy balance, the dependences of heat capacity on temperature are constructed in the temperature range suitable for this work. Enthalpy of vaporization, $\Delta_v h$, is calculated via equation (7)

$$\Delta_v h = C_1 \cdot (1 - T_r)^{C_2 + C_3 \cdot T_r + C_4 \cdot T_r^2} \tag{7}$$

where, C_1, C_2, C_3, C_4 are substance-specific coefficients, T_r is reduced temperature (K) calculated using equation (8), where T_c is critical temperature (K).

$$T_r = \frac{T}{T_c} \tag{8}$$

3. Results and Discussion

In this work, mass flow of air entering the first compressor of 30 t.h^{-1} is considered, with the inlet temperature of 300.15 K and the assumed mass fraction of water vapor of 0.0168. Before further calculations, the *x-y* and *T-x,y* diagrams are constructed, both for ideal and real mixture, based on the calculated data. As examples, Figures 5 and 6 are provided, depicting isobaric x-y diagrams at the total pressure of 1.5 bar.

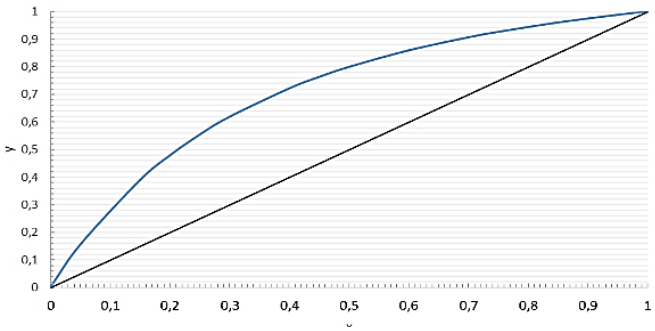

Figure 5: x-y diagram of air as ideal mixture at 1.5 bar

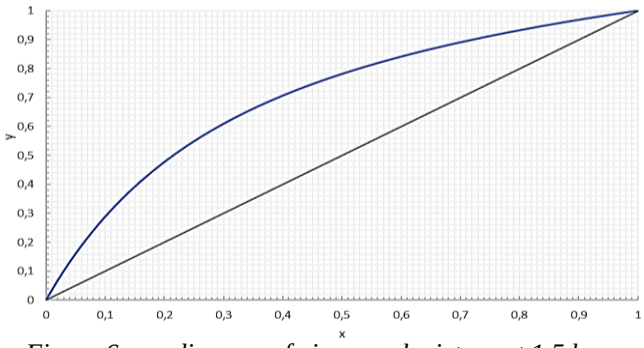

Figure 6: x-y diagram of air as real mixture at 1.5 bar

Comparison of these two diagrams proves that air cannot be modeled as an ideal mixture, which is also confirmed by the activity coefficients. For an ideal mixture, activity coefficients of every component are equal to 1. The activity coefficients are calculated at average temperatures and are presented in Table 2.

Table 2: Activity coefficients

Component	*6 bar; 102.60 K*	*1.5 bar; 85.95 K*
Nitrogen	0.9487	1.0215
Oxygen	1.1199	1.124

The McCabe-Thiele method helps to determine the number of theoretical stages for each type of mixture and for each part of the column. The results are presented in Table 3.

Table 3: Number of theoretical stages. LPC = low-pressure column, HPC = high-pressure column

Mixture	*LPC*	*HPC*
Ideal	7	3
Real	6	4

The calculated mass flow of condensed water vapor (kg.h^{-1}) in each condenser and adsorber is summarized in Table 4. It is assumed that air leaving the adsorber is dry. Material balance is summarized in Table 5.

Table 4: Balance of water vapor in the studied process

Mass flow $\dot{m}$ (kg.h^{-1})	*Humidity $\bar{Y}$ (kg.kg^{-1})*
$\dot{m}_3$ = 181.4	$\bar{Y}_1$ = 0.01711
$\dot{m}_6$ = 192.60	$\bar{Y}_4^{eq}$ = 0.01096
$\dot{m}_8$ = 130.66	$\bar{Y}_7^{eq}$ = 4.43.10^{-3}

Table 5: Material balance of the studied process

Stream Nr.	*Mass flow $\dot{m}$ (kg.h^{-1})*	*Stream Nr.*	*Mass flow $\dot{m}$ (kg.h^{-1})*
10, 13, 14	26278	22, 23, 24	1573
11, 12	3217	25, 26, 27	1644
15, 16 ($\dot{N}$)	23169	28	1190
17, 18, 19 ($\dot{N}$)	461	29, 30 ($\dot{O}$)	4675
20, 21	3002	31	1430

Mass flow of produced oxygen gas, $\dot{O}$, is 4675 kg.h^{-1} with the purity of 95 %. Stream $\dot{N}$ is almost pure nitrogen, which can also be used as inert gas if ASU is integrated in a refinery or it can be supplied to other consumers.

The power input of both compressors is approximately the same and reaches 953 kW. This leads to specific power consumption for oxygen production of over 400 kWh per ton of oxygen. Based on Figure 1, it can be stated that the amount of energy required for compression is high, and therefore it is necessary to optimize the process further.

A system of equations was designed for this system, consisting of an enthalpy balance of two heat exchangers and the air separation column. Temperatures were calculated for each stream in equilibrium based on their composition and were used to calculate enthalpies. Temperatures of streams are summarized in Table 6.

Table 6: Temperatures of streams

Stream Nr.	*Temperature (K)*	*Stream Nr.*	*Temperature (K)*
10, 11	303.15	20	97.55
12, 13	100	21, 22, 31	96.96
15	82.09	24, 27	83.33
16, 19, 30	298.15	25	100.33
17	81.33	28	92.58
18	82.09	29	93.52

Thermodynamic states of streams were defined based mainly on literature, but also from the equilibrium T-x,y diagram. For stream 14, a temperature-entropy diagram was used estimating that this stream exits the expander as a gas-liquid mixture.

Duty of individual heat exchangers and the separation column were also calculated using the enthalpic balance. The duty of the secondary heat exchanger is 25 kW while that of the main heat exchanger is 875 kW and that of combined condenser/vaporizer is 141 kW.

4. Conclusions

Based on the literature survey and process material and heat balances, a cryogenic air separation unit was designed, yielding 4675 kg.h^{-1} of oxygen with the purity of 95 % vol.

Since the amount of supplied air is 30 t.h^{-1}, which has to be compressed from 1 bar to 6 bar, two-stage compression was assumed with the calculated power input of both compressor stages being approximately the same, 953 kW. The power input of compressors is too high compared with the most efficient air separation units operated nowadays, so further optimization is needed. This is one of the long-term goals.

The mass ratio of streams 10 and 11 of 0.1765 was initially adopted from literature but the calculations yielded its adjustment to 0.1224.

It was demonstrated that the mixture of oxygen and nitrogen does not behave as an ideal mixture; therefore, its modeling as a real mixture was necessary. Using the McCabe-Thiele method for both ideal and real mixture, the theoretical number of stages in HPC and LPC was estimated.

Enthalpy balance of the separation column and heat exchangers provided their heat duties as 25, 875 and 141 kW for the secondary heat exchanger, the main heat exchanger and the combined condenser/vaporizer, respectively.

Acknowledgements

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INITIAL RESULTS OF AN INDUSTRIAL COMBINED HEAT AND POWER (CHP) UNIT MODEL FOR REPOWERING OPTIONS ASSESSMENT

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Abstract: *Today's world faces several problems including carbon emissions to the atmosphere and the resulting greenhouse effect. Therefore, attention should be paid to electricity and heat production using fossil fuel combustion in thermal power plants as one of the sectors with a potential for improvement. Repowering an old thermal power plant fueled with heavy fuel oil or coal that results in the plant modification is an efficient method to achieve this goal. In this study, the first phase of a case study focused on repowering an industrial heating plant is presented. Its general features, layout and equipment are considered and a mathematical model for steady state operation description is set up. Assumptions and limitations for the calculations, for instance heat losses, reference state or mechanical restrictions are set and some of the repowering methods are briefly mentioned, such as using a gas turbine or an internal combustion engine. Results are presented with key performance indicators, and their changes resulting from repowering are discussed while building the basis for the optimization process.*

Keywords: *thermal power plant, repowering, material and enthalpy balances, cogeneration efficiency*

1. Introduction

Thermal power plants (TPP) as we know them today are becoming obsolete. Due to the coal and mineral oils combustion for heat and power production, their large carbon footprint has become a big issue in the modern world. According to the Paris Agreement, reducing emissions is a significant part of our lives which can be accomplished by substituting the above-mentioned fuel for another one that is less harmful to the environment. This goal can be achieved by replacing carbon-based fuel for natural gas or biomass. When the substitution of fuel is not an option, partial repowering should take place. It is a complicated process of transforming an old TPP into one with greater capacity, higher efficiency, and lower greenhouse gases emissions. These days, improving the district heating system is a trend in the whole world including Europe and new projects, such as the Heat Roadmap Europe project and the STRATEGO project (Enhanced Heating and Cooling Plans in EU), are in progress.

1.1 Partial Repowering

Essential repowering can be achieved either by feed water repowering, which means using heat from the turbine exhaust to increase the feed water temperature, or boiler repowering, i.e., major steam generator replacement [1]. Many repowering methods include converting an old steam power plant into a combined cycle system by topping it by gas turbines.

A good example of coal-fired heat sources is repowering with cogeneration of heat and power (CHP), which is created by incorporating an internal combustion engine with a system of heat exchangers or a gas turbine and heat recovery steam generator [2]. One way or the other, the result is the decrease in emissions and increase in power plant production.

1.2 Gas Turbine and Internal Combustion Engine

A gas turbine (GT) is a heat engine that converts part of the heat content of a gaseous working medium to mechanical energy by its expansion. It mainly consists of a compressor that compresses combustion air, a combustion chamber where combustion of fuel and air takes place and a turbine for flue gas expansion. GTs are reliable in operation, producing small quantities of emissions and are quite flexible. On the other hand, they are expensive and their high requirements on fuel quality are a major disadvantage [3].

An internal combustion engine is a machine that usually converts chemical energy contained in fuel into mechanical work of a moving piston and subsequently into thermal or kinetic energy of the exhaust gas. Its low price, high efficiency, and low specific weight are convenient while higher emissions, noise and large vibrations caused by various movements of many parts are making the combustion engine less attractive to the industry compared to GTs [3].

1.3 Thermal versus Electric Power Plant, Goals

A significant number of studies on the efficiency improvement of an electric power station have been performed. The irrefutable fact is that solid fuels, mainly coal, are dominant in the structure of the heat production system in certain countries of the world, including countries in Europe, to which not many experts pay attention [2]. That is a major push to resolve the ongoing issues of developing heat production technologies that lead to sustainable development. Our long-term goal is to

analyze an industrial TPP designed for burning liquid fossil fuels. The aim is to decide whether a gas turbine or an internal combustion engine is a better, more advantageous, option for its repowering. An essential part of the selection process is to elaborate material and heat balances of its current operation. To meet this goal, a mathematical model has to be developed based on the description of the current state of the power plant.

2. Materials and Methods

First, a mathematical model of a power plant was developed. In this paragraph, a closer look at the original plant model scheme and the computational model are provided.

The mentioned scheme consists of several technological units, which are presented in figures 1 to 4. Generally, streams in gaseous state are depicted in dashed lines, while solid lines represent liquid streams.

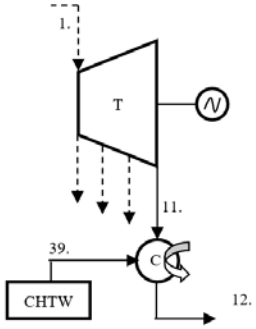

Figure 1: Extraction-condensing turbine with a condenser

Fig.1 represents a turbine driven by high pressure steam (stream no. 1) produced in a steam boiler fired with heavy fuel oil. Apart from electricity cogeneration, high-, intermediate- and low-pressure (HP/IP/LP) extraction steam is produced both for export and usage in the TPP. Water and steam losses due to steam export, losses from the degasser, and from the blowdown expander need be replaced with chemically treated water (CHTW) from the reservoir. Vapor-liquid mixture (wet steam) from the turbine (stream no.11) and condensates from low temperature water heaters flow to the condenser with CHTW. After condensation at 30°C, the mixture (stream no.12) is pumped as feed water with a pump to a sequence of three low-temperature water heaters.

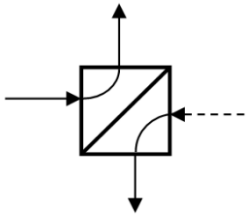

Figure 2: High/low temperature water heater

As presented in Fig.2, extracted steam is applied as heating medium in these heaters. To ensure sufficient heat-exchange driving force, condensing temperature of the inlet steam is 5°C above the temperature of the outlet feed water. As previously mentioned, condensates from these heaters are mixed with the wet steam from the turbine. It is assumed that in every low temperature water heater, the temperature of feed water is increased by further 30°C, so the temperature of water exiting heater no. 3 (stream no.16) is 120°C.

The degasser displayed in Fig.3 has two main purposes. It is used for feed water degassing and it is also a feed water heater where the inlet water mixes with steam from another steam turbine extraction, fuel and air pre-heating condensates, expander steam stream and high temperature condensates from heaters. Temperature of the outlet feed water (stream no.17) is 150°C. Stream no. 33 is the degasser exhaust which makes up 6% of steam bleed for the degasser.

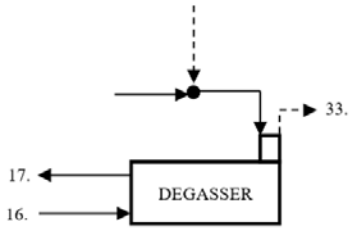

Figure 3: Degasser

Feed water from the degasser is pumped through high temperature water heaters to the boiler where it is transformed from liquid to gaseous state (stream no.1) at the temperature of 530°C and the pressure of 9 MPa, using combustion of pre-heated fuel (stream no.35) with air (stream no.37) producing exhaust gases (stream no.38). Concentration of dissolved components in the steam should be controlled to maintain proper function of the turbine blades by adding chemicals in the water cycle, which affects the composition of the feed water. Therefore, some water in the boiler is drained forming a blowdown (stream no.30) [4]; representing 1.5% of the total steam output. Blowdown energy content is partly utilized in a blowdown expander. The complete process is presented in Fig.4.

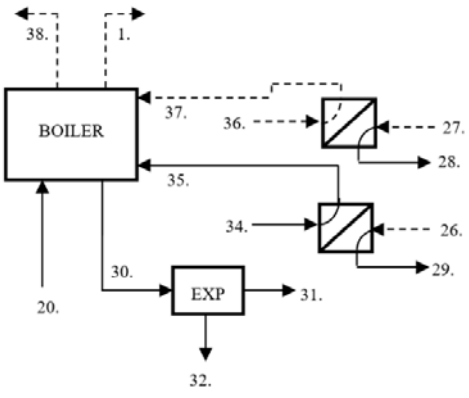

Figure 4: Boiler with expander, fuel, and air pre-heaters

Determination of stream enthalpies is the next step. The reference state for water and steam is 0°C, 611 Pa, liquid, thus enthalpies are taken from the water tables and graphs. Steam outlets from turbine and superheated steam enthalpies are determined from the h-s diagram of water vapor and from the properties of boiling water and saturated water vapor [5]. Steam outlets after polytropic expansion and their enthalpy is calculated from equation (1.1.) for isentropic efficiency η_{IS}:

$$\eta_{IS} = \frac{h_1 - h_3}{h_1 - h_2} \qquad 1.1.$$

where h_1, h_2 = enthalpies after isentropic expansion, h_3= enthalpy after polytropic expansion.

Efficiencies of 90% and 80 % is assumed for steam expansion in the superheated and wet steam regions, respectively.
Condensate enthalpy is obtained from the tables - Properties of boiling water and saturated water vapour [5]. Enthalpy of exhaust gases is calculated using the tables - Molar heat capacity of substances as a function of temperature [5]. Humid air enthalpies are calculated from equation (1.2.):

$$\bar{h}_{\bar{Y}} = \overline{cp}_G \,.\, (T - T_{ref}) + \bar{Y} \,.\, (\overline{cp}_W^g \,.\, (T - T_{ref}) \qquad 1.2.$$

where $\overline{cp}_G$ = heat capacity of air, T = temperature of humid air, T_{ref} = reference temperature of air (0°C), $\bar{Y}$ = relative mass fraction, $\overline{cp}_W^g$ = heat capacity of water vapor.

Special attention was paid to distinguishing the temperature of humid air in summer and winter and to how these circumstances affect the total material and heat balance of the thermal power plant.

If the mass flow of all input streams is listed as $\dot{m}_{in}$ and h_{in} is the streams enthalpy, outlet stream as $\dot{m}_{out}$ with their enthalpy h_{out}, then the general material and heat balances of the process are presented in equations (1.3.) and (1.4.).

$$\sum \dot{m}_{in} = \sum \dot{m}_{out} \qquad 1.3.$$

$$\sum h_{in} \dot{m}_{in} = \sum h_{out} \dot{m}_{out} \qquad 1.4.$$

Minimal production of 60MW of electric energy equally in winter and summer is assumed. Export stream mass flows are listed in Table 1.

Table 1 Steam produced for export

type of steam	$\dot{m}_{winter}(t/h)$	$\dot{m}_{summer}(t/h)$
HP	60	60
IP	80	80
LP	130	30

Total material and heat balances of the turbine are presented in equations (1.5.) and (1.6.).

$$\dot{m}_1 = \sum \dot{m}_{export} + \sum \dot{m}_{extraction} + \dot{m}_{11} \qquad 1.5.$$

$$h_1 \dot{m}_1 = \sum h_{export} \dot{m}_{export} + \sum h_{extraction} \dot{m}_{extraction} + h_{11} \dot{m}_{11} + \frac{P_{el}}{\eta_{mech}} \qquad 1.6.$$

where P_{el} = electric output, η_{mech} = mechanical efficiency of the turbine with the lower index denoting the stream number. Fuel used for combustion is a heavy fuel oil and its composition (in mass fraction, w) is: carbon (87%), hydrogen (12%) and sulfur (1%). Stochiometric chemical equations taking place in this process with stochiometric coefficients of the substances (ν) are (equation (1.7.)):

$$C + O_2 \rightarrow CO_2$$
$$H_2 + \frac{1}{2} O_2 \rightarrow H_2O \qquad 1.7.$$
$$S + O_2 \rightarrow SO_2$$

Prior to the calculation of the lower heat value, standard enthalpy of formation of individual substances must be red from the tables - Basic properties of pure substances and Antoine constants [5]. Due to the defined reference state of 0°C, the first step is to recalculate the listed values using equation (1.8).

$$\Delta_f h_i^{0°C} = \Delta_f h_i^{25°C} + \overline{cp}_i \,.\, (t_{ref} - t) \qquad 1.8.$$

where $\Delta_f h_i^{0°C}$ = formation enthalpy at 0 °C, $\Delta_f h_i^{25°C}$ = enthalpy from tables, $\overline{cp}_i$ = heat capacity of the substance, t_{ref} = reference temperature of 25°C, t = 0°C.

Lower heating values for each chemical reaction are calculated by equation (1.9.) and are eventually added together in equation (1.10.).

$$Q_{Di} = (-\nu_i) \,.\, \Delta_f h_i + (-\nu_j) \,.\, \Delta_f h_j + (\nu_k) \,.\, \Delta_f h_k \qquad 1.9.$$

$$Q_D = w_C \,.\, Q_{D1} + w_{H_2} \,.\, Q_{D2} + w_s \,.\, Q_{D3} \qquad 1.10$$

The actual value is by approximately 6-7% lower due to the energy of chemical bonds in the molecules.
For comparison purposes, cogeneration efficiency is computed using equation (1.11.).

$$\eta_{cog} = \frac{P_{el} + Q_{exp}}{Q_{comb}} \qquad 1.11.$$

where Q_{exp} = amount of exported heat, Q_{comb} = heat released during fuel combustion.

3. Results and Discussion

Even before designing repowering options, it is important to assess the actual operation of the TPP. Therefore, all assumptions (energy losses, exports, fuel composition etc.) were considered and the mass flow of used fuel, produced

steam in boiler, condensing vapor-liquid mixture in the condenser and used CHTW were calculated. Additionally, exported heat, final power output and cogeneration efficiency calculations were done. Results are presented in Table 2.

Table 2 Most important performance indicators

	Winter	Summer
$\dot{m}_1(t/h)$	438.58	396.75
$\dot{m}_{35}(t/h)$	28.55	25.41
$\dot{m}_{11}(t/h)$	20	85.53
$\dot{m}_{39}(t/h)$	274.76	174.27
$Q_{exp}(MW)$	222.2	143.1
$P_{el}\ (MW)$	62.22	60
$\eta_{cog}\ (\%)$	88.16	70.75

The results show lower cogeneration efficiency in summer, which is caused by lower LP steam demand, therefore a higher amount of steam is expanded in the low-pressure part of the turbine and discharged to the condenser creating more waste heat. This implies that more electricity is produced using typical extraction-condensing process, while electricity is generated using back pressure technology in winter.

These findings correspond with various publications of the past few years. The overall effect of ambient temperature and weather factors on the heat demand is significant. A study carried out by Żymełka and Szega pointed out the importance of weather changes when optimizing a CHP plant using forecasting models applied to CHP plant data [6].

According to the paper published at the North China Electric Power University, the waste heat contained in the condensing wet steam represents considerable amount of the total energy consumption of power plants. The authors believe that waste heat recovery should be pursued, thus improving the energy utilization efficiency, and contributing to fuel saving [7]. This supports the claim that lower cogeneration efficiency is caused by steam from the extract-condensing turbine condensing in the condenser. Reduced demand for heat and increased demand for electricity is one of the many indicators that need be considered in the CHP optimalization process.

4. Conclusions

In this paper, initial examination of a CHP unit model was performed. The aim was to describe the operation of an old heavy fuel oil power plant and its performance parameters in winter and in summer. The main equipment includes one steam boiler, one extraction-condensing turbine and its condenser, and a sequence of water heaters with a degasser and a blowdown expander. This case study forms the basis for our long-term goal – evaluation of repowering an existing CHP system.

Based on the calculations, different plant operation was identified in summer and in winter, further investigation has shown the importance of including ambient temperature in the industrial combined heat and power unit optimization because of its impact on the final power output and fuel consumption. It is expected that repowering of this plant results in its longer lifespan and in cleaner heat and power production.

Acknowledgements

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SELECTION OF CRITICAL MECHANICAL OBJECTS OF AN AGRICULTURAL TRACTOR TO OPTIMIZE THE MAINTENANCE PROGRAM

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Abstract: *One of the possibilities of increasing the profitability of machine operation is to optimize its maintenance program. To optimize it, it is important to know dependability of each machine part. This article analysis a vast database containing operation data of 166 agricultural tractors of the same model. The database contains 3262 records. Time period of data acquired data was from 4.1.2010 to 28.5.2019.The maintenance record with the smallest wear and tear that appears in the database is 0 EH (probably a pre-sale preparation of the machine) and the largest 19006 EH. The database contain complete and not complete data , which it means that many of the monitored mechanical parts are in operation state and have not failed. Using critical quantification, 10 critical components were selected. Weibull's analysis of the dependability was used to acquire dependability data to identify suitable parts for program maintenance optimization. As the most suitable was chosen Torsional vibration damper. α value and shape parameter 3,28, r^2 coefficient of determination 0,93 and mean operating time to failure E(t) 10477 EH were calculated for this part.*

Keywords: *Dependability, Weibull distribution, Agriculture, Tractor*

1. Introduction

It is necessary to optimize the operation program to secure a profitable operation of a machine. Even though it is impossible to prevent machine failure it is important to minimize the probability of one and its consequences. [1] It is necessary to identify critical machine parts to be able to optimize maintenance program to secure the biggest profitability. For dependability reasons we must obtain a sufficient amount of operation data. [2]

General failures distributions for continuous data are normal, lognormal, exponential and Weibull [3].

Weibull is very often used to determine dependability approximation. It is very flexible and it can be applied for data modeling without regards to failure tendencies (rising, falling or constant). It is essential to keep track of time of failing, cycles, shipping distance, mechanical stress or similar continuous or discrete parameters [4, 5].

Shape of the function is dependent on many parameters of the Weibull distribution [6].

As a part of the contributions we work with an extensive database of maintenance interventions performed on the agricultural tractor. 10 critical parts are chosen from this database through critical quantification. Weibull analysis is performed on these 10 parts. The analyzed data are complete in cases in case of complete failure and incomplete in cases where a part did not fail. Results of the analysis are later used for selection of suitable parts for the application of recovery theory.

2. Materials and methods

2.1 Determination of criticality of machine parts and selection of critical machine parts for further analysis

The database used to calculate indicators of dependability consists of 3262 records. The time period in which the maintenance data were acquired is from 4.1.2010 to 28.5.2019. Data were recorded on 166 machines of the same model of agriculture tractor. The operating hour [EH] is used as a unit of operating time. The maintenance record with the smallest wear and tear that appears in the database is 0 EH (probably a pre-sale preparation of the machine) and the largest 19006 EH.

Critical components of PE were selected by this procedure:

1. Determining the number of occurrences of failures of individual components in the monitored period.
2. Deletion of irrelevant records (objects changed within preventive maintenance programs, work operations, connection of diagnostic devices, etc.).
3. To ensure the usability of the calculated dependability indicators, objects with the number of occurrences of failures <10 were removed from the database.
4. Calculation of average prices of components in the monitored period.
5. The criticality was quantified using the equation:

$$K = n_F \cdot C \quad (1)$$

where, K = criticality and n_F = number of failures in a given time period (1) and C = average prices of the components for the period (EUR/ given time).

Division of components into three categories according to their criticality using Pareto analysis in the ratio A = 80%, B = 10% and C = 10% of the total cumulative value of the criterion.

Selected objects for further research are listed in Table 1.

Table 1 Selected components for research according to criticality

Nomenclature of components	*Name of the nomenclature*	*Criticality*
RE535729	Exhaust gas cooler	1813695,83
SE502330	Turbocharger	1543399,18
RE537578	Torsional vibration damper	449349,35
RE43738	Tensile force sensor	352457,50
SE501227	Water pump	319146,07
AL160250	Three-way brake valve	304104,34
AL168483	Fuel pump	69313,17
RE543308	ERG valve	2510,23
RE523318	Turbo actuator	2453,77
RE167207	Engine oil pressure sensor	416,62

2.2 Calculation of parameters of Weibul distribution and coefficient of determination

The data were processed using the Weibull analysis with the support of an Excel spreadsheet. The analysis procedure was in accordance with the standard ČSN EN 61649:2009:

- Ascending order of input data
- Bernard's approximation
- Substitution to modified distribution function *F(t)*
- Linear regression – equation of line
- Calculation of shape α and scale β parameters of Weibull distribution [7]

Firstly, it is necessary to sort the individual values in ascending order i = 1, 2, 3, … n. For the estimation of the distribution function *F(t)* is used order statistic with the median order. Usually, Bernard's approximation is used to calculate the median order:

$$F_i(t) = \frac{i-0,3}{n+0,4} \tag{2}$$

where, $F_i(t)$ = estimate of median value (-) and i = rank of serial number of time to failure t and n = total number of failures.

In contrast, the calculation procedure for complete data is necessary to take into account of influence of censored data - modified procedure:

$$i_{t_i} = i_{t_{i-1}} + m_{t_i} \tag{3}$$

$$m_{t_i} = \frac{(n+1)-i_{t_{i-1}}}{1+(n-m)} \tag{4}$$

$$F_i(t) = \frac{i_{t_i}-0,3}{n+0,4} \tag{5}$$

where, m_{ti} = modified number of previous objects (events) and i_{ti} = adjusted number of time to failure t.

Weibulls distribution function transformed into equation of line si used to calculate parameter α and parameter β of Weibulls distribution.

$$F(t) = 1 - exp\left[-\left(\frac{t}{\beta}\right)^{\alpha}\right] \tag{6}$$

$$1 - F(t) = exp\left[-\left(\frac{t}{\beta}\right)^{\alpha}\right] \tag{7}$$

$$ln[1 - F(t)] = -\left(\frac{t}{\beta}\right)^{\alpha} \tag{8}$$

$$ln\left[\frac{1}{1-F(t)}\right] = \left(\frac{t}{\beta}\right)^{\alpha} \tag{9}$$

$$ln\left\{ln\left[\frac{1}{1-F(t)}\right]\right\} = \alpha \cdot ln(t) - \alpha \cdot ln(\beta) \tag{10}$$

Transformation of equation into line:

$$y = k \cdot x + q \tag{11}$$

where, y = dependent variable and x = independent variable and k = slope of a line and q = point of intersection of line with x-axis and y-axis, absolute term.

$$x = ln\,(t) \tag{12}$$

$$y = ln\left\{ln\left[\frac{1}{1-Fi(t)}\right]\right\} \tag{13}$$

Line equation is found by using least-square method and solving system of equations:

$$q \cdot \sum_{i=1}^{n} x_i + k \cdot \sum_{i=1}^{n} x_i^2 = \sum_{i=1}^{n} x_i y_i \tag{14}$$

$$n \cdot q + k \cdot \sum_{i=1}^{n} x_i = \sum_{i=1}^{n} y_i \tag{15}$$

Then:

$$k = \frac{n \cdot \sum_{i=1}^{n} x_i y_i - \sum_{i=1}^{n} x_i \cdot \sum_{i=1}^{n} y_i}{n \cdot \sum_{i=1}^{n} x_i^2 - \left(\sum_{i=1}^{n} x_i\right)^2} \tag{16}$$

$$q = \frac{\sum_{i=1}^{n} x_i^2 \cdot \sum_{i=1}^{n} y_i - \sum_{i=1}^{n} x_i \cdot \sum_{i=1}^{n} x_i y_i}{n \cdot \sum_{i=1}^{n} x_i^2 - \left(\sum_{i=1}^{n} x_i\right)^2} = \overline{y_l} - k \cdot \overline{x_l} \tag{17}$$

The coefficient of determination r^2 is used to determine the statistical significance of the regression equation. Coefficient of determination is interpreted as the ratio of the sum of squares of the aligned (predicted) values and the sum of the squares of the observed values [9].

$$r^2 = \frac{\left(n \cdot \sum_{i=1}^{n} x_i y_i - \sum_{i=1}^{n} x_i \cdot \sum_{i=1}^{n} y_i\right)^2}{\left[n \cdot \sum_{i=1}^{n} x_i^2 - \left(\sum_{i=1}^{n} x_i\right)^2\right] \cdot \left[n \cdot \sum_{i=1}^{n} y_i^2 - \left(\sum_{i=1}^{n} y_i\right)^2\right]} \tag{18}$$

2.3 Calculation of Mean Operating Time to Failure

it is necessary to know the mean operating time to failure *E(t) also known as MOTTF*, to correctly choose the suitable part of the machine for optimization of the maintenance program.

For the calculation in excel we use the formula for gamma function Γ – GAMMA:

$$E(t) = MOTTF = \beta \cdot \Gamma\left(\frac{1}{\alpha}\right) \tag{19}$$

3. Results and discussion

The selection of machine parts for maintenance program optimization is made based on the values of the shape

parameter α, the determination coefficient r^2 and the mean operating time to failure E (t). Sets the wear phase if the shape parameter α > 1 [8]. The coefficient of determination r^2 is a number between 0 and 1. Eg. if r^2 = 0.10 in the experiment, it means that the experimental effect can be attributed from 10% percent to the influence of intentional action by the experimental factor and 90% to other, usually unknown influences [10]. For this experiment, $r^2 > 0.7$ is a statistically significant agreement. The service life of an agricultural tractor is usually at the level of 30,000 EH. After this time, as a rule, any correction is economically loss-making. It is therefore advisable to select for optimization those parts having E (t) <30000 EH. Table 2 lists selected machine parts for cost optimization.

Table 2 Selected parts for costs optimization of maintenance program

Machines component		*α shape parameter*	*β scale parameter*	*r^2 coefficient of determination*	*E(t) [EH]*	*Optimalization*
RE535729	Exhaust gas cooler	1,47	13601	0,67	12313	NO
SE502330	Turbocharger	1,43	35137	0,78	31936	NO
RE537578	Torsional vibration damper	3,28	11683	0,93	10477	YES
RE43738	Tensile force sensor	0,86	36663	0,88	39585	NO
SE501227	Water pump	2,86	14739	0,92	13136	YES
AL160250	Three-way brake valve	0,71	113460	0,90	141273	NO
AL168483	Fuel pump	2,58	22919	0,95	20351	YES
RE543308	ERG valve	1,06	57135	0,58	55784	NO
RE523318	Turbo actuator	2,00	23413	0,93	20749	YES
RE167207	Engine oil pressure sensor	2,03	21374	0,85	18937	YES

To give the reader a complete idea of the dependability of the selected components, the dependability characteristics were calculated using the values of the parameters of the Weibull distribution. For Torsional vibration damper are graphically shown on Fugure 1:

- Probability density function of failure *f(t)*
- Probability of failure *F(t)*
- Reliability function *R(t)*
- Failure rate *λ(t)* [11].

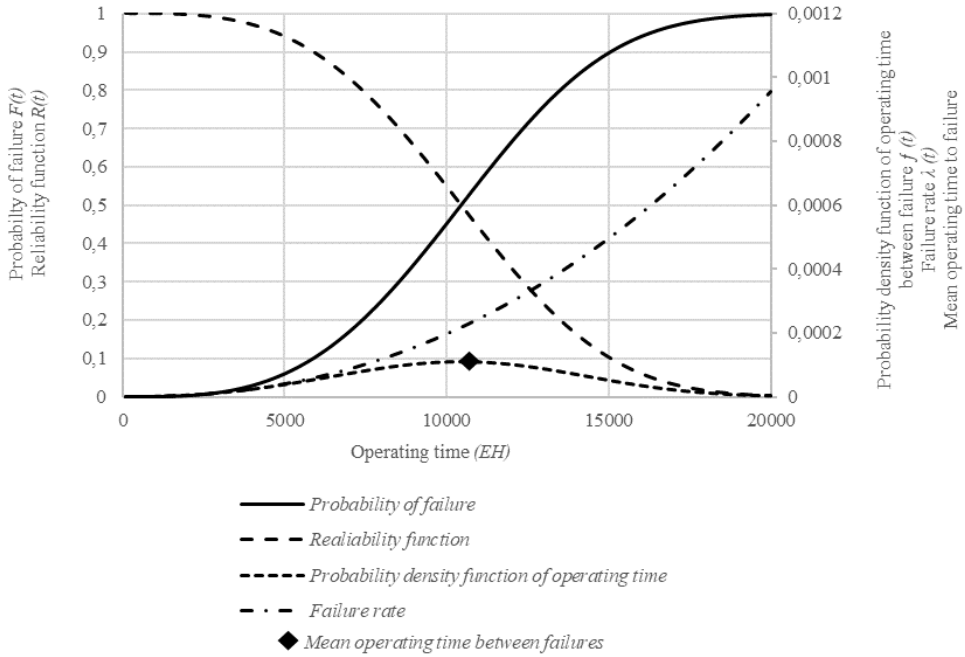

Figure 1: Dependability characteristics F(t), f(t), R(t), λ(t) for RE537578 Torsional vibration

3. Conclusions

One of the ways to increase the profitability of machine operation is to optimize its maintenance program. Therefore, to optimize the program, it is necessary to know the dependability data of individual machine parts. In this paper, an extensive database containing data on the operation of 166 agricultural tractors of the same model was analyzed. Using critical quantification, 10 critical

components were selected, Information on the dependability of the components was obtained by calculating the parameter Weibull distribution α shape parameter, the coefficient of determination r^2 and the mean operating time to failure *E(t).* Torsional vibration damper, Water pump, Fuel pump, Turbo actuator and Engine oil pressure sensor were selected to optimize maintenance. The methodology is suitable for algorithmization and integration into the ERP system of the service organization.

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OPTIMIZATION OF THE RESOURCES OF THE NETWORK SCHEDULE OF THE INFORMATION SYSTEM WITHOUT INTERRUPTION OF WORK

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Abstract: *Improving the efficiency of information systems design is an urgent task. In this work, the optimization of the network schedule resources for the creation of an organization's information system is carried out. A network schedule was developed for the implementation of a set of works when creating an organization's information system. A linear diagram of the execution of a complex of operations and a diagram of resource consumption are built. The optimal solution to the problem has been determined. Optimization of the network schedule is performed on the condition that the operations do not allow interruption in execution. The results of the study make it possible to reduce financial costs and increase the validity of decisions made at the design stage of an organization's information system.*
Keywords: *information system, network diagram, critical path, line diagram, time reserves, optimal solution, resources*

1. Introduction

Improving the efficiency of information systems design is an urgent task [1-4]. To solve this problem, the methods of operations research are used. Mathematical models allow you to study phenomena, processes and objects of the subject area with the lowest financial costs [5-19]. In this paper, the optimization of the network schedule by resources is considered, provided that the operations do not allow a break in execution.

2. Statement of problem

Determine the start and end times of the network schedule, at which at any moment of the planned period there would be enough resources to carry out the work and the completion time of the complex would be minimal.
From the first to the eighth day, 3 units have been allocated ($R = 3$). From the ninth to the tenth day, four units are allocated ($R = 4$). From the eleventh to the twelfth day, there are two units ($R = 2$). From the thirteenth to the nineteenth day, there are five units ($R = 5$). Six units are allocated from the twentieth day ($R = 6$). The works of the complex are characterized by the duration of execution and the amount of resources for its implementation.

3. Algorithm for solving the probleml

The algorithm for solving the problem includes stages.
Stage 1. A line diagram of the implementation of a complex of works and a diagram of resource consumption are built.
Stage 2. The start and end of the complex works are projected onto the time axis. The interval (τ_k ; τ_{k+1}) on the time axis is determined.
Stage 3. Determine the total time reserves of the work R_{ij} located above the interval (τ_k ; τ_{k+1}).
Stage 4. The selected works are numbered in ascending order of the total time reserves.
Stage 5. The quantities of work resources are summed up in ascending order of numbers. If the amount of resources is less than the available resources, then the work does not move. Otherwise, the work is shifted by the amount of the gap (τ_k ; τ_{k+1}).

The process is iterative until τ_{k+1} reaches τ_{kp}. To create a line chart, define a list of work stages, time, and number of employees. The content, time of work and number of workers are resulted in table 1.

Table 1 List, time of network activity and number of workers

Activity code	*Statement of activity*	*Duration* t_{ij}	*Number of workers* r_{ij}
1-2	Development of technical specification. Development of technical design. Coordination of technical specification with technical design. Adoption of technical specification. Adoption of technical design	2	2
2-3	Inspection and analysis of administrative buildings of management in Kurgan	3	2
2-4	Inspection and analysis of administrative buildings of management in regional departments	3	3
3-5	Realization of groundwork in management in Kurgan	2	2
4-5	Realization of groundwork in regional departments	4	2
5-6	Development of structure of computer network. Choice and justification of network architecture of computer network. Choice of satellite Internet provider. Purchase of computation, network equipment. Purchase of satellite equipment. Purchase of software	5	5
6-7	Delivery of computation, network equipment into management. Delivery of satellite equipment into management in Kurgan. Delivery of software into management	2	1

6-8	Delivery of equipment into regional departments. Delivery of satellite equipment into regional departments. Delivery of software into regional departments	4	2
7-9	Installation of computer network in management. Installation of satellite equipment in management. Connection of network equipment in management in Kurgan. Connection of satellite equipment in management in Kurgan. Software installation in management in Kurgan	5	4
8-9	Installation of computer network in regional departments. Installation of satellite equipment in regional departments. Connection of computer network in regional departments.. Connection of satellite equipment in regional departments. Software installation in regional departments. Hardware setup in regional departments	4	2
9-10	Personnel training. Computer system testing. Personnel examining. Acceptance of information system into service	2	1

The activity network is shown in figure 1. Arrows of the activity network have time of network activity t_{ij} and number of workers r_{ij} .

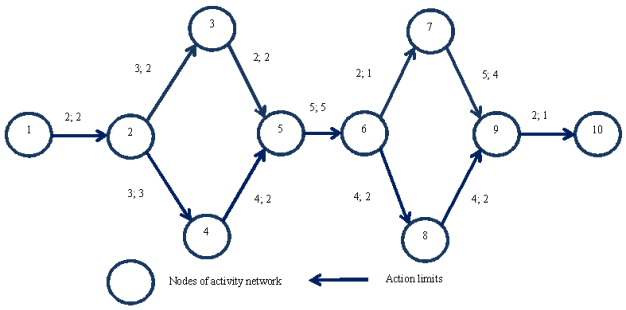

Figure 1: The activity network

Time parameters of events of the activity network count for definition of a critical path.

Earliest expected event time is calculated according to the formula

$$ES_j = \max_{i,j}\{ES_i + t_{ij}\}$$

where, ES_j = earliest expected time of event j and ES_i = earliest expected time of event i and t_{ij} = time of network activity i, j .

Latest event occurrence time is calculated according to the formula

$$LC_i = \min_{i,j}\{LC_j - t_{ij}\}$$

where, LC_i = latest occurrence time of event i and LC_j = latest occurrence time of event j .

The algorithm of critical path includes stages.

1 Stage. Earliest expected time of event i is equal to latest occurrence time of event i .

$$ES_i = LC_i$$

2 Stage. Earliest expected time of event j is equal to latest occurrence time of event j .

$$ES_j = LC_j$$

3 Stage. Difference between earliest expected time of event j and earliest expected time of event i is equal to difference between latest occurrence time of event j and latest occurrence time of event i . Difference between latest occurrence time of event j and latest occurrence time of event i is equal to time of network activity i, j .

$$ES_j - ES_i = LC_j - LC_i = t_{ij}$$

Diagrams of the required and available number of workers are shown in figure 2.

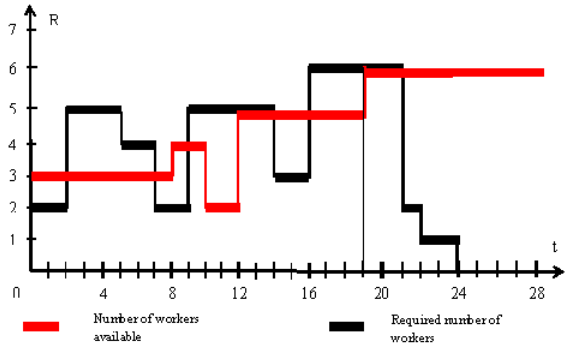

Figure 2: Diagrams of the required and available number of workers

4. The solution of the problem

The linear diagram of the execution of a complex of works with intervals (τ_0 ; τ_1) and (τ_1 ; τ_2) is shown in figure 3.

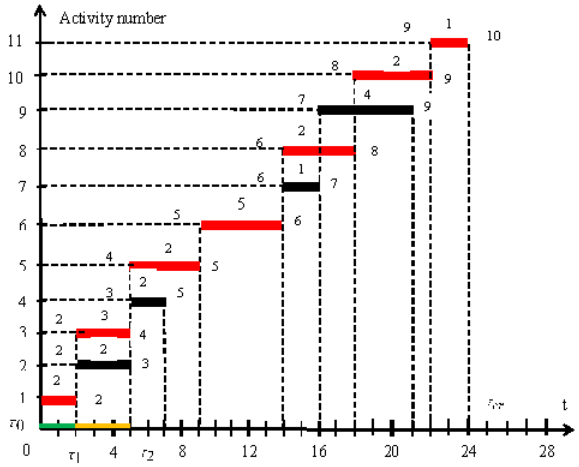

Figure 3: The linear diagram of the execution of a complex of works with intervals (τ_0 ; τ_1) and (τ_1 ; τ_2)

The network diagram with the critical path is shown in figure 4.

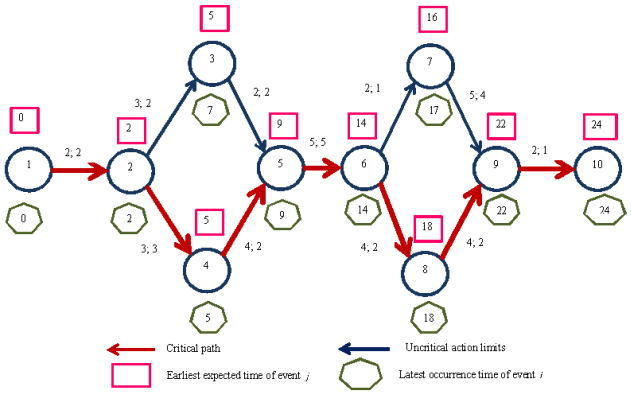

Figure 4: The network diagram with the critical path

A line diagram of a complex of works with an interval (τ_2 ; τ_3) is shown in figure 5.

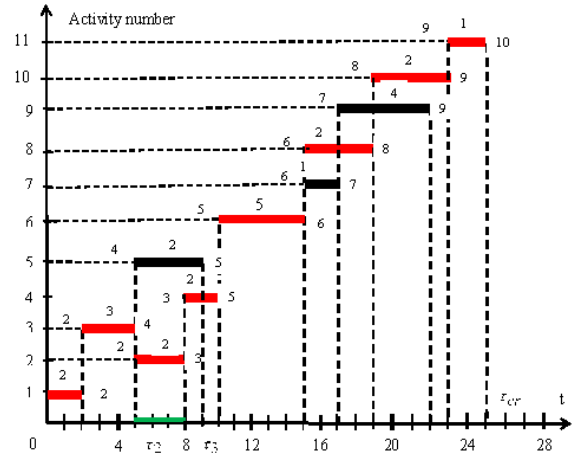

Figure 5: A line diagram of a complex of works with an interval (τ_2 ; τ_3)

The network diagram is shown in figure 6.

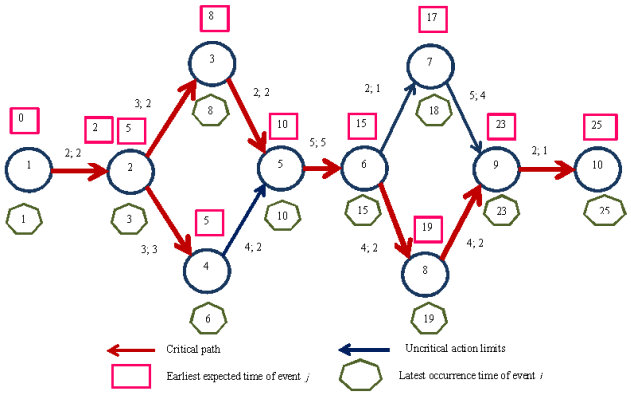

Figure 6: The network diagram

A line diagram of a complex of works with an interval (τ_3 ; τ_4), (τ_4 ; τ_5), (τ_5 ; τ_6), (τ_6 ; τ_7),(τ_7 ; τ_8), (τ_8 ; τ_9), (τ_9 ; τ_{10}), (τ_{10} ; τ_{11}) is shown in figure 7.

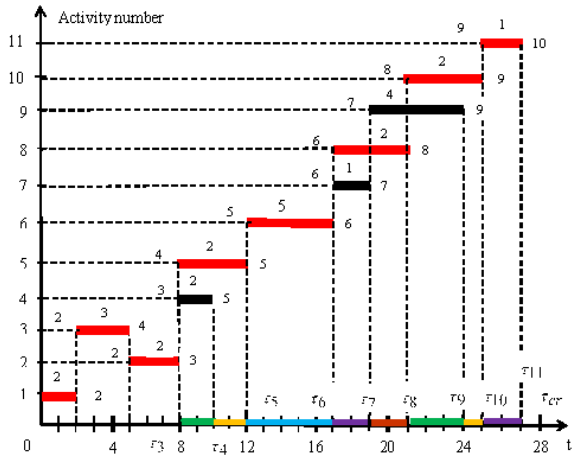

Figure 7: A line diagram of a complex of works with an interval (τ_3 ; τ_4), (τ_4 ; τ_5), (τ_5 ; τ_6), (τ_6 ; τ_7),(τ_7 ; τ_8), (τ_8 ; τ_9), (τ_9 ; τ_{10}), (τ_{10} ; τ_{11})

The network diagram is shown in figure 8.

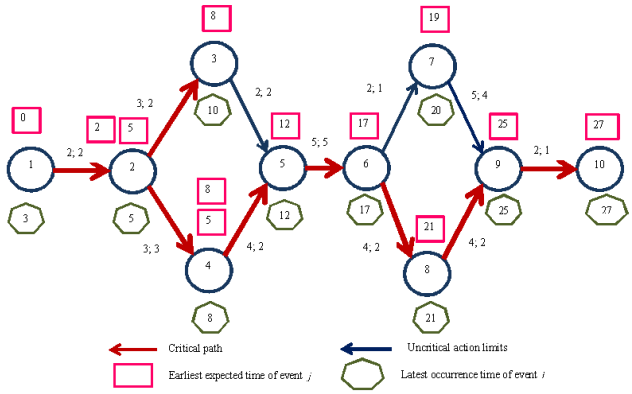

Figure 8: The network diagram

Diagrams of the required and available number of workers after resource optimization are shown in figure 9.

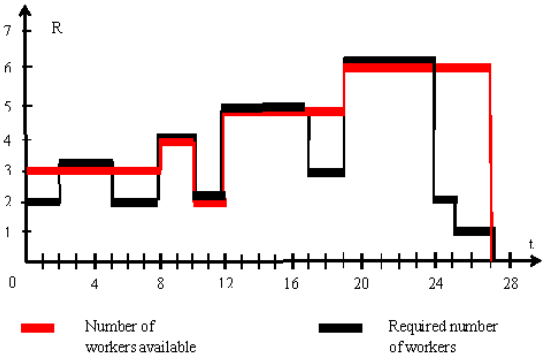

Figure 9: Diagrams of the required and available number of workers after resource optimization

To perform a complex of works with minimal time, provided that at any moment of the planned period there will be enough resources to perform the work, it is necessary to perform the following actions: do not shift work (1,2) on the interval ($\tau_0 ; \tau_1$); do not shift work (2,4), work (2,3) shift by 3 days on the interval ($\tau_1 ; \tau_2$); do not shift work (2,3), work (4,5) shift by 3 days on the interval ($\tau_2 ; \tau_3$); works (3,5) and (4,5) do not shift on the interval ($\tau_3 ; \tau_4$); work (4,5) should not be shifted on the interval ($\tau_4 ; \tau 5$); work (5,6) do not shift on the interval ($\tau_5 ; \tau_6$); works (6.7) and (6.8) do not shift on the interval ($\tau_6 ; \tau_7$); work (6.8) and (7.9) do not shift the interval ($\tau_7 ; \tau_8$); works (7.9) and (8.9) do not shift on the interval ($\tau_8 ; \tau_9$); work (8,9) should not be shifted on the interval ($\tau_9 ; \tau_{10}$); work (9.10) should not be shifted on the interval ($\tau_{10} ; \tau_{11}$).The critical path time is 27 days. Critical path topology 1-> 2-> 4-> 5-> 6-> 8-> 9-> 10.

5. Results of research

The results of the research allow us to draw the following conclusions.

1. A line diagram and a network schedule for the implementation of a set of works when creating an organization's information system have been developed.
2. Optimization of the network schedule resources was performed using a linear diagram of the complex of works
3. The time and topology of the critical path are determined.
4. The application of the results obtained allows you to reduce financial costs and increase the validity of the decision when designing information systems of organizations.
5. The received results can be used in the further researches on this topic.

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IRON LINKED DISEASES – MINI REVIEW

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Abstract: *Iron is one of the most studied essential biogenic metallic element. Its presence in the plants is needed for photosynthesis, that is a crucial process for life on earth. Iron in human organism occurs in many forms and exhibits different functions – from oxygen transport (haemoglobin and myoglobin), storage to catalytic function in enzymes. However iron in its ionic form is for living organisms dangerous so it must be somehow built in more complex forms and that makes regulatory mechanism more complicated. Iron is partly received from a diet and the uptake is rather complicated and individually dependent on actual conditions within digestive tract. Deficit or iron overload could lead to serious health damages that can affect quality and length of life. Iron deficit also makes organism more vulnerable against other diseases and in the combination with different health issues it can be very dangerous. Excessive iron can react with other molecules occurred in the organism or accumulate in organs. This can lead to functional changes in the human brain, cause neurodegenerative diseases and help pathogens to grow and induce diseases. This paper is a mini review of diseases linked to iron content in living organisms.*

Keywords: *iron deficit, iron surplus, iron levels, iron diseases*

1. Introduction

Iron is one of the biogenic metal elements that occurs in every living organism. Its appearance in the plant, animals and human organisms is necessary for their proper functioning. In plants, iron is stored in the chloroplasts and it is obtained from the soil by roots. Iron deficit in plants is usually visible (yellow leaves). It is called chlorosis and the change of colour appears due to lower content of chlorophyll and a change of the light absorbance capacity which causes a decrease in light-dependent reactions of photosynthesis [1]. Human organisms obtain iron from food by sorption in the small intestine. Plant based food deliver non-hem iron in the form of siderochromes. Animal food delivers hem iron. Iron is stored in liver, spleen and in the bone marrow [2] and participate in oxygen transport (haemoglobin and myoglobin), electron transport and catalytic processes. Iron toxicity is a result of Fenton reaction that causes harmful radical production [3]. Iron content in the living organism must be strictly regulated. Human organisms are unable of excess iron excretion, therefore is iron balance regulated by the controlled iron absorption from diet. Fluctuations of iron can cause serious damages. Concentration of iron is 40 mg/kg of body weight in men and 50 mg/kg in women [4,5]. Inaccurate iron content, whether surplus or deficiency, usually lead to health issues. This paper deals with the most common diseases associated to iron in human organisms.

1.1 Iron deficit

Insufficient bioavailable iron in a diet is one of the major causes of iron deficiency worldwide [6] and iron deficit is also one of the most prevalent nutritional problem [7].

The most known iron deficit disease is anaemia ant it is defined as disease with low haemoglobin content along with one/more indicators, such as low content of iron storage. Anemia caused primarily by the iron deficit occurs in specific groups, such as children, adolescents, pregnant women and elderly people. Iron deficit occurs mainly in the regions of developing countries, where diet consists of cereals with high content of iron absorption inhibitors [7]. Solution of this situation is the prevention and proper treatment. Main strategies of iron deficit treatment are based on a change of diet, pharmaceutical iron supplementation and food fortification. Generally, the best source of iron are animal products, which are not available to low-level socioeconomic groups [7]. That is why the pharmaceutical iron supplementation and food fortification are better for treatment of large groups. Iron deficit also often occurs in a combination with other health issues.

Anemia is very common in a cancer patient. The European Cancer Anemia Survey states, that 39.3 % of oncologic patients is anaemic, with the majority (29.3 %) having mild anaemia with the haemoglobin concentration within 10-12 g/dl. Anemia, as other diseases, affects quality of life and the length of survival. Managing of anaemia in a combination with cancer could have a positive impact on treatment. In non-chemotherapy-induced anaemia, the serum iron levels vary during the day and ferritin levels are low. Patients with serum ferritin less than 15 ng/ml suffer from iron deficiency. If treated, haemoglobin level can raise up till normal level within 2 months of treatment [8]. Anemia is very common also in a gastrectomized patients. Approximately 50 % of patients deal with anaemia in a combination with gastrectomized health issues [9].

Adequate iron level is critical for the growth of the new-borns. Their growth is very fast, and they need sufficient levels of nutrients. Suboptimal iron level within the

process of breastfeeding can lead to cognitive dysfunctions. This could be reversed by appropriate treatment [10].

On the other hand, iron deficit could protect human organisms from pathogens that cause diseases. Pathogens dependent on iron supply could due to the iron regulation „starve to death'', that is why anaemic patients are resistant to *Plasmodium falciparum* (parasite causing malaria) [11, 12].

1.2 Iron surplus

Iron is stored in the ferritin – iron storage protein. It is released when needed. Excess iron is stored in human organs, and symptoms are related to specific organ impairment [13], such as liver diseases, diabetes mellitus, endocrine disorders, etc. with its appearance after a long time of accumulation (40+ years). Untreated surplus can reduce life expectancy by 10 years and early diagnostic can prevent the development of disease and fix life expectancy back to normal [5]. Serum ferritin greater than 300 ng/ml is in men considered as iron overload. Iron overload in women is within the range of 150-200 ng/ml [13]. Long - term iron surplus in liver can predict cardiac diseases caused by iron overload [5].

1.2.1 Hemochromatosis

Iron overload with a genetic predisposition to excessive iron gastrointestinal absorption (absorption that surpasses the physiological storage capacity) is the primary cause of hereditary hemochromatosis. Excessive absorption causes increase of free iron which penetrates human cells. Accumulation of iron leads to fibrosis that affects functions of organs. Hemochromatosis is treated using iron chelators and routine medical examinations and genetic testing are great tools for prevention [5].

1.2.2. Thalassemia

There are many effects that can cause iron surplus. One of the most common is multiple parental transfusions of thalassemia treatment. Thalassemia is inherited blood disorder with decreased haemoglobin production. Thalassaemia patients are usually treated by the blood transfusion aimed at maintaining the haemoglobin level at 10.5 g/l [14]. Patients treated by multiple transfusion can evolve secondary iron overload (iron within transfused erythrocytes is stored within the cells). Ineffective erythropoiesis can increase demand of iron for erythrocyte precursors in the bone narrow. This leads to increasing of iron absorption in small intestine. Also, many of the chronic hepatopathies lead to an iron overload. Damage and harmful consequences of iron overload is related to the extent of the excess iron [5].

1.2.3 Neurodegenerative diseases

Liver and brain contain the highest amount of iron. In the brain, it is about 60 mg nonheme iron distributed within the brain structures. Iron content in brain structures differs. This confirms the idea that unbalanced iron concentrations in human brain cause movement disorders [15]. *Substantia nigra* and *globus pallidus* can obtain even more iron than liver (3.3-3.8 mM). Iron accumulation in brain increases with the ferritin concentration increase. Ferritin dysfunctions produce high concentration of iron in human organisms that can react with other structures. There were found crystals of magnetite, maghemite, hematite and ferrihydrite in brain of patients with neurodegenerative disease [16,17,18] which suggest complex reactions of iron released from ferritin with other substances present and followed by the processes of mineral formation. Damaged mechanisms of iron regulation can contribute to development of neurodegenerative diseases. It is interesting, that iron content in the human brain and excessive iron accumulation seem to be unrelated to iron serum levels. Accumulation of iron in senile plaques (approximately 1 mM) is one of the Alzheimer's disease symptom. Parkinson's disease is characterized by accumulation of iron in high concentrations. Increased iron content could be found in most patients that suffer from Parkinson's disease, especially in *substantia nigra*. The brain of the patients who succumb to the neurodegenerative disease obtained 225 % increase of intracellular iron concentration [19]. Ageing is the riskiest factor of neurodegenerative diseases development.

Many more diseases, such as Huntington's diseases, Friedreich spinocerebellar ataxia, ALS or Prion disease correlates with the iron metabolism changes. All of these diseases are connected by the specific cellular apoptic death and the presence of abnormal iron concentrations in the affected areas. It is still unknown, if the accumulation of iron is the cause or a result of these diseases [19].

1.2.4 Iron and infections

Iron is for the growth and replication of most microorganisms and human pathogens essential. Clinical studies show that thalassaemia patients are more vulnerable to pathogens such as *Escherichia coli, Vibrio vulnificus, Vibrio cholera, Klebsiella, Listeria monocytogenes, Shigella,* hepatitis B and C, HIV and many more. In a study group of 1455 patients were shown significant increase of bacteria presence in those whose serum obtained high ferritin content. Since the pathogens are dependent on iron too, there is a competition between the host and pathogen. Obtaining of iron is crucial for pathogen's existence and for infection destruction. One of the key strategies for infection protection is limited access of free iron [20].

1.2.5 Respiratory diseases

Respiratory diseases cause 1 of 6 deaths worldwide. Unregulated homeostasis of iron seems to have an impact on the development of respiratory diseases such as lung cancer, obstructive pulmonary disease, idiopathic pulmonary fibrosis, cystic fibrosis, asthma and acute respiratory distress syndrome. Many respiratory pathogens developed mechanisms of the effective source of iron from the host [20]. Iron is essential for all living organisms as well as for pathogens. To reduce growth and replication of pathogens, the limitation of iron supply is needed.

Lungs obtain approximately 0.4-0.9 mg/g of iron (dry weight) [21]. Iron contained in the lungs is obtained from many sources and the most generous one is the serum iron from absorption and catabolised erythrocytes. Many pathological lungs conditions showed increased iron levels due to haemoglobin catabolism. Mining, wind erosion from pollution, etc. can also increase iron level in the lungs through inhalation of air with higher iron concentration. Iron in the lung is stored mainly in ferritin. Iron exposure increases production of lung ferritin [22]. Long term iron loading increases iron levels in the lung, which increases iron accumulation in macrophages. In the maintaining iron homeostasis, macrophages play a crucial role. Macrophages storage iron from different sources. This is an important step in the lung protection from potential invading pathogens [20].

Iron particles are obtained also in cigarette smoke. These particles can force iron accumulation and change lung iron homeostasis [23]; thus, it is very common that smoker's lungs contain increased iron and ferritin levels [24]. Many studies shows that cigarette smoke is the biggest risk factor for the development of COPD (chronic obstructive pulmonary disease) [25,26, 27,28, 29]. Cigarette smoke is also one of the risk factors for the lung cancer development, and it causes approximately 80-90% lung cancer [30]. In the serum of lung cancer patients was also found increased level of ferritin [31]. The prognosis and survival of lung cancer patients is associated with concentration of ferritin serum [32]. Long term iron deficit, abnormal iron homeostasis and increased iron accumulation were found in experimental models of cystic fibrosis (CF) and human patients who suffer from CF [33]. Increased iron levels in CF patients can induce an increased response to bacterial infections associated with CF [20]. Another lung disease connected to iron is idiopathic pulmonary fibrosis (IPF). Exact causes of the IPF development are unknown, but smoking, presence of dust, silica and infections have been suggested as important risk factors [34]. Total iron levels and production of oxygen radicals associated to iron are in the IPF patients higher than in the controlled group [35]. It has been shown, that accumulation of excess iron is also associated with IPF [36]. Lower iron levels were found in the children and adults who suffered from asthma. It is not clear whether lower iron levels are consequences of disease or a cause of its development [37, 38, 39].

2. Conclusions

Iron is in nature very important bio element. Chemistry of iron is one the most studied fields and further study is still needed. There are yet many unsolved processes of the iron chemistry, but their impact on the life on earth is enormous. Iron deficit and surplus causes many health issues – in plants, animals and mainly in human organisms. In human organisms, health issues are caused mainly by iron surplus. We described some of the iron linked diseases. It is very important to have the proper iron intake and regular health checks can prevent the development of the diseases described.

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PATHOGENESIS-RELATED PROTEINS AND THEIR ROLES IN FLAX (LINUM USITATISSIMUM L.)

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Abstract: *The enzymes of chitinases and β-1,3-glucanases have originally been defined as defensive enzymes related to pathogenesis. Their importance in resistance towards biotic stress has been proven in different plant species, including the agrotechnically important flax. The functions of these enzymes, however, diverged during evolution. Their defensive functions have been extended to abiotic stresses as well, and both enzymes showed crucial also in normal physiological or morphological roles. The available literature is rather scattered, therefore we summarize and discuss here the available data on the involvement of these two enzyme types in different processes in flax, including defense, fiber formation and embryogenesis.*

Keywords: *embryogenesis, hyperaccumulation, metal uptake, PR proteins*

1. Introduction

Pathogenesis-related proteins (PRs) have been discovered as proteins that appear in plant tissue early upon infection of plants with pathogens. They have been classified into several groups PR 1- 11 [1], while chitinases (PR 3) and β-1,3-glucanases (PR 2) have most often been studied as promising tools for gene transfer and improvement of crop resistance against pathogens. A role in defense is typical for chitinases as they can restrict fungal growth by lysing chitin in cell walls of pathogens. In contrast, original function of β-1,3-glucanases is in cell division. The two enzymes act in defense either directly by degrading the cell walls of the pathogen, or by releasing elicitors from cell walls and triggering downstream responses including other PRs, phytoalexins and many other defense components [1]. During evolution, the function of both enzyme types has diverged towards many different roles in not only defense against environmental cues, but also in important physiological and morphological processes. Available data, however, are rather scattered in literature. We summarize here the involvement of these two enzyme families in selected processes in the ancient, agrotechnically important flax (*Linum usitatissimum* L). Flax is widely used not only as seed and fiber in the food industry, animal feed and seed in agriculture, but also as fiber in the textile industry. PR proteins have been identified to play role in several of corresponding processes.

1.1 PR proteins in flax

The genome of flax has been sequenced, but neither chitinases nor β-1,3-glucanases have been surveyed to provide a complete picture on their occurrence and functions. In the NCBI gene bank, three chitinase and two β-1,3-glucanase entries were retrievable to the March 20th 2021, however, whole-genome shotgun sequencing and *de novo* assembly of the flax nuclear genome [2] allows for exploring these gene families in more details. Several high-throughput methods have resulted in data sets obtained on flax, which enabled data mining and collection for PRs regardless on the aim of experiment (see below).

1.2 Response to biotic stress

Fusarioses represent one of the most serious threats to flax cultivation. The fungus *Fusarium oxysporum* f. sp. *lini* (Fol) is highly specific to flax, therefore it counts for the most dangerous Fusarium species causing more than 20% productivity losses [3]. Both chitinases and β-1,3-glucanases have been demonstrated to inhibit fungal growth *in vitro* as well as *in planta*. Moreover, transgenic plants accumulating these enzymes, primarily those belonging to class I types, have been shown to resist pathogen attack more efficiently [4]. For example, overexpression of a β-1,3-glucanase (albeit originating from potato) enhanced resistance of flax against *Fusarium* [5]. Using comparative transcriptomic analysis Dmitriev et al. [6] identified a β-1,3-glucanase gene as highly expressed upon fungal attack in different flax genotypes, while the authors recognized it as a good candidate gene conferring resistance to *F. oxysporum* infection in flax.

Activation of chitinase gene expression in time of Fol infection has been repeatedly recognized in several reports on various crops, including [7]. Transcriptome analysis of two fibrous varieties of flax has focused on systemic responses of flax seedlings against the fungus and identified numbers of differentially expressed chitinase as well as β-1,3-glucanase genes. These were mostly much more strongly expressed in the resistant cultivar than in the susceptible one [8]. The two gene types can be efficiently activated by application of elicitors as well; the natural holaphyllamine (HPA) and the synthetic M4 exogenously applied compounds activated many defense genes including those in focus of this review and reinforced flax resistance towards *F. oxysporum* infection [9]. Methylation/demethylation rate of chitinase and β-1,3-glucanase genes in flax seems to play important role in their regulation, moreover apparently shows specificity towards differently pathogenous *F. oxysporum* [10].

Chitinases have been used and identified as markers of flax defense responses against *Fusarium*. RNA sequencing approach was chosen to study transcriptome alterations in two flax cultivars with different disease susceptibility, while four chitinase enzymes were studied in details [11]. The genes were selected based on the previus study of Mokhshina et al. [12], who predicted pathogen responsiveness. Three of them (LusCTL 10, 11 and 14) proved induced by disease, together with another three other identified chitinase genes [11]. The individual genes showed earlier activation in the resistant flax cultivar; constitutive and/or sooner defense activation provides advantage for more efficient retardation of pathogen invasion [11].

In flax infected with pathogenic strain of *F. culmorum* the polymers of cell walls appeared rearranged due to induction of a single chitinase within 6 h and two β-1,3-glucanase genes within 12 h, along with multiple genes for enzymes like cellulase2, α-galactosidase and several lignin-related genes [13]. Noteworthy, expression of the majority of genes involved in metabolism of cell wall polysaccharide polymers decreased in time. Chitinases were differentially expressed also in flax inoculated with virulent or avirulent strains of *Melampsora lini*, the cause of flax rust [14], in contrast to chitinases in wheat inoculated with avirulent or partially avirulent wheat rust strains.

A chitinase gene has been identified as indirectly responsible for fungal resistance of flax plants expressing a heterologous lycopene β-cyclase gene, likely through the homeostasis mechanism [15].

1.3 Response to abiotic stress - heavy metals

Though several reports are available on application of different high-throughput techniques on flax responses to abiotic stresses e.g. drought [16], the enzymes of chitinases or β-1,3-glucanase are surprisingly rarely explicitly mentioned or discussed. We believe this is not because they play no role in responses to abiotic cues, but due to their indirect or supporting activities that are neglected. Nevertheless, chitinase enzymes appear to play role in metal tolerance of flax. Total chitinase activities have been found as variable among different flax cultivars, but not significantly responsive to exposure to cadmium [17]. At individual enzyme level, however, all of the three detected isoforms exerted Cd responsiveness, yet not in the same way or to the same extent. Activation of chitinase isoforms correlated with metal sensitivity and probably acts as a component of general defense mechanisms. Further, it allowed for selecting the variety that appeared most promising for phytoremediation programs, as well as for recognizing the most sensitive variety with highest potential health risk by means of producing contaminated food [17].

Krasnov et al. [18] have reported on RNA-sequencing data of flax exposed to aluminium toxicity. In this study, however, neither chitinases nor β-1,3-glucanases have been discussed, though deposition of callose (a substrate of β-1,3-glucanases) is generally considered as an early marker of aluminium stress in different plant species [19].

1.4 Embryogenesis and seed formation

Chitinases and β-1,3-glucanases have been linked to embryogenic processes in different plant species. Several chitinases, mainly of class IV, have proven indispensable in somatic embryogenesis [20], while they have been suggested as markers of embryogenesis.

Flax seed development has been studied in details using comprehensive genomic analysis [21]. Unfortunately, the study does not discuss the involvement of neither chitinases nor β-1,3-glucanases, though data are available for several members of these gene families in the supplementary material. The data confirm activation of these genes in different stages of embryo development, while none of them appeared specific to a single specific stage.

Initiation of flax embryogenesis was accompanied by induction of a 25 kDa protein with chitinolytic activity in the conditioning medium of the embryo culture [22]. Activation of this protein differentiated the embryogenic and non-embryogenic cultures, nevertheless the suggestion it could be a marker of embryogenic potential has never been confirmed.

Flax chitinases associated with the walls of morphogenic cells could generate Nod-like oligosaccharide signals that trigger differentiation process in flax protoplasts into small embryogenic cell aggregates [23], but a function providing nursering conditions for somatic embryo induction and cell wall degradation has also been suggested for some chitinases or glucanases [24].

1.5 Fiber formation and quality

Flax phloem fibers are highly important for industry and for developing sustainable materials, therefore intensive research is being undertaken on the nature of fiber structure and its impacts on mechanical properties or fiber-related costs. Many of these depend on the composition of gelatinous-type secondary walls of bast fibers. Development of the gelatinous cellulosic walls has shown to involve several chitinase-like proteins (CTLs) with novel specific functions [12]. CTLs represent a large gene family that comprises genuine chitinases as well as homologous proteins with no true enzyme activity.

CTLs are believed to take part in cellulose biosynthesis and play a key role in establishing interactions between cellulose microfibrils and hemicelluloses [25]. Instead of catalysis, CTLs take part in binding of chitin oligosaccharides or generation of signals for different organogenic processes [12]. The study identified CTLs, which likely are related to secondary wall formation of xylem and possibly in in phloem fiber cell wall development. A distinct group of flax CTLs had very high enrichment in samples with phloem fibers (e.g. peel, fiber)

with cellulose-rich, gelatinous walls, but had a low level of expression in xylem. These genes might play a unique role during gelatinous cell wall development in general and cellulose synthesis in particular and contribute to differences in mechanisms of xylan and gelatinous cell wall formation [12].

The retted fiber of transgenic flax overexpressing a β-1,3-glucanase from potato [5] was studied and showed unchanged essential mechanical characteristics, however, it changed the composition of the cell walls [4]. These included increased content of cellulose, hemicellulose and uronic acid, and lowered content of lignin. The callose content has also dropped in the transgenic fiber, generating excess glucose that probably bind phenolic compounds and hamper their contribution in lignin synthesis. As a consequence, the mechanical and also the antioxidant properties of the fiber were strengthened confirming the beneficial contribution of β-1,3-glucanases to not only plant resistance but also extended biomedical applications of flax fiber [4]. The results of the experiment inspired the development of a novel method, using which methylation/demethylation of the endogenous gene has been altered in flax [7]. Application of short oligodeoxynucleotides antisense to the coding region of the β-1,3-glucanase gene resulted in up-regulation of β-glucanase and chitinase genes and led to resistance against *Fusarium*.

2. Future perspectives of research

At present, the sequence of the entire flax genome is already known and represents a good precondition for deeper research. Due to its useful properties, flax is highly topical in various areas of the industry and economy, therefore research oriented towards better oil composition, improved fiber quality and tolerance to environmental cues is expected to continue. Despite of relatively low biomass, good metal uptake and accumulation capacity of flax renders it promising for different remediation programs as well.

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NON-PHARMACOLOGICAL APPROACH TO COGNITIVE CHANGES IN MULTIPLE SCLEROSIS

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Abstract: *Prediction of the prevalence of cognitive impairment among people with MS range from 40% to 70%. Changes in cognitive function observed in people with MS include problems in areas such as comprehension and use of speech, word finding, abstract reasoning, visual perception and construction, calculation skills, attention/ concentration, memory, and executive functions. Cognitive deficits disrupt daily activities, family and social relationships and work life. The need to maintain cognitive function in MS requires comprehensive treatment, including non-pharmacological interventions. The article presents non-pharmacological methods recommended by many experts in the research of multiple sclerosis.*

Keywords: *cognitive impairment, multiple sclerosis, non-pharmacological methods, diet, exercise.*

1. Introduction

Cognitive change is one of the most important clinical signs of neurodegenerative disorders, including multiple sclerosis (MS). Research shows that up to 65% of patients with MS have cognitive deficits, such as episodic memory, continuous attention, decreased verbal fluency; however, the cognitive domain of MS is the speed of information processing. It is the first syndrome of cognitive dysfunction and most affected in MS. Sometimes, these disorders occur before the physical symptoms appear. Fatigue and depression are significant symptoms in the clinical picture of impaired cognition. These factors cause a decrease in quality of life, social exclusion, resp. isolation and unemployment. Patients with MS are less exposed to various activities, professional and social, and more prone to psychiatric illness. Cognitive deficits are observed in all types and stages of the disease, but especially in the primary and secondary progressive stages. The main factors influencing cognitive decline in patients with MS are age, quality of life, fatigue, emotional disorders, substance abuse, metabolic dysfunctions (DM, liver failure), psychiatric disorders (depression), drugs (sedatives, antidepressants) [1].

1.1 Lifestyle to manage MS

There are currently no treatment methods to prevent mood deterioration or cognitive impairment due to MS, so many patients use complementary non-pharmacological approaches. Non-pharmacological procedures, such as psychotherapy, neuropsychological rehabilitation, and relaxation training, are generally effective in cognitive manifestations in people diagnosed with MS [2]. Dietary changes are also recommended; dietary approaches to MS vary and may consist of allergen-free supplements (gluten, milk) and / or polyunsaturated fatty acid supplements, vitamins (vitamin D), trace elements and / or antioxidants (selenium, Gingko biloba, coenzyme Q10). Higher intakes of greens, sulfur-rich vegetables, and brightly colored vegetables and fruits also provide more useful food molecules (flavonoids, polyphenols, thiols) that can affect multiple molecular pathways affecting MS disease activity. Gluten sensitivity is also associated with neurological dysfunction and white matter changes in the brain and spinal cord [3]. Therefore, a nutrient diet and avoids foods associated with white matter damage and neurological symptoms in genetically predisposed individuals is likely to be beneficial for MS and is associated with less risk than traditional pharmacological approaches [4].

Physical activity is another factor influencing the development of MS. Systematic reviews have shown that physical interventions and increased physical activity are associated with improved cardio-respiratory function, quality of life, muscle strength, body composition, fitness, disability, fatigue, and mood. Many studies have found that multimodal intervention (diet, exercise, EStim, stress management) significantly improved quality of life and fatigue in people with progressive MS. This non-pharmacological approach may also benefit mood and cognitive function in people with MS and may be associated with less risk than pharmacological interventions [4, 5].

1.2 Non-pharmacological methods

There are currently many other therapies (supplements, nutraceuticals and functional foods) or methods such as brain stimulation, yoga, aerobic training. Non-pharmacological methods include physical exercise, sleep, meditation, computer training, brain stimulation, yoga or music. These are recommended due to their high safety profile and low-cost methods, in particular (table 1) [6].

Table 1 Non-pharmacological intervention in MS

Aerobic Training	Several clinical studies revealed some benefits for executive control including planning, selective attention, multitasking work, and inhibition, working memory, particularly in women with MS [7].
Sleep	Many studies confirmed that short time naps during a day have positive effect on memory performance and concentration,

	integration and reprocessing of fresh memories into the existing reservoir of long-term memories [1].
Neuropsychological rehabilitation	Cognitive rehabilitation as a multifactorial intervention has not shown significant evidence in many studies. However, studies have shown that cognitive training can increase memory range and working memory and, in combination with other neuropsychological methods, can improve attention, immediate verbal memory and long-term memory [1, 8].
Whole Body Cryostimulation	A limited number of studies suggest that it may be a promising additional therapy in patients with MS with fatigue [9, 10].
Computer Based Training	Benefit from computer-based cognitive training in memory performance, in executive functions/ processing speed have been confirmed in many studies [11, 12, 13].

1.3 Cognitive rehabilitation

Rao et al. [14] found that persons with MS who were cognitively impaired participated less in social and vocational activities, were less likely to be employed, had greater difficulties in doing routine household tasks, and were more at risk of psychiatric illness than persons with a purely physical disability. Functional impairments also include difficulty in shopping independently, completing house-work, cooking, driving, and using public transport [15]. In general, these changes to patients' personal, occupational, and social lives have a deleterious impact on their quality of life (QoL).

The importance of applying cognitive rehabilitation lies in the support and strengthening of self-sufficiency, self-confidence, self-esteem and communication, socialization of the individual. Different types of exercises focus on cognitive areas: sensory perception, orientation, attention, memory, executive functions, stimulation of physical activity [16]. The treatment of cognitive dysfunction in MS is either aimed at compensating for deficits or is restorative, focusing on strategies to improve performance. However, the greatest success has been achieved in compensation strategies. The possibilities of formal treatment of cognitive deficits are limited. Patients with global cognitive impairment, especially memory impairment, are unlikely to benefit from standard psychological interventions [17]. Recovery approaches include procedures such as memory trainings designed to enhance memory functions and exercises to improve information processing, speed, and efficiency. Direct practice is to some extent based on the assumption that the human brain has a certain degree of "plasticity" and, if properly and systematically practiced, may be able to regain certain functions.

In recent years, there has been a gradual shift in attention to compensatory methods, such as the use of organizational strategies, registration / archiving systems, laptops and other tools. Compensatory methods do not attempt to restore cognitive impairment [15].

2. Conclusion

Research into the treatment of MS is advanced, but effective treatment has not been established for cognitive problems. Therefore, it is necessary to find new strategies that can be used especially in the early stages of MS to prevent a decline in cognition. Many studies recommend applying a multimodal approach to the MS treatment with cognitive impairment.

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THE ISSUE OF BURNOUT FOR LAY CAREGIVERS OF PATIENTS WITH DEMENTIA IN EASTER SLOVAKIA

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Abstract: *The aim of our research was to determine the degree and nature of the burden of caregivers providing care for a relative with Alzheimer's disease at home. Identify areas where lay carers felt the greatest degree of stress and factors which are influenced by the perceived burden. Alzheimer's disease is the most common type of dementia in old age. The disease varies substantially affected not only life, but the whole family. Care is challenging for all is an enormous burden. The largest share of assistance to those institutions do not, but above all their families with the possibility of using social and health services.*

Keywords: *Alzheimer's disease, dementia, family, caregiver.*

1. Introduction

Dementia includes a group of diseases in which occur as a result of the disease process of brain cognitive decline. Alzheimer's disease (AD) is the most common for dementia a neurologic disease characterized by loss of mental ability severe enough to inter free with normal activities of daily living, lasting at least six months, and not present from birth. AD usually occurs in old age, and is marked by a decline in cognitive functions such as remembering, reasoning, and planning. A person with AD usually has a gradual decline in mental functions, of ten beginning with slight memory loss, followed by losses in the ability to maintain employment, to plan and execute familiar asks, and to reason and a judgment. Communication ability, mood and personality also may be affected. Most people who have AD die within eighty ear so their diagnosis, although the interval maybe as short as one year or as long as 20 years. AD is the fourth leading cause of death in adults after heart disease, cancer, and stroke. According to measure of disability patient depends at home to caregiver, usually to relative. Lay care giver is a person, who helps meet the needs of their family member – care receiver. They perform activities, which the care receiver would have done themselves, if they had enough strength, will-power, or necessary knowledge. Without help of the care giver the care receiver could not stay in their home milieu in many cases [1]. In our work we focused on the issue of burden of lay care givers, who care for their relatives with dementia. The aim of the work was to map the degree of nursing burden in families providing care for an ill relative suffering from dementia.

1.1 Methods of study

The survey was implemented in the territory of Prešov´s region in months of February and March 2012. The survey sample consisted of 60 addressed respondents, who take care for a family member with dementia. The non-standardized questionnaire focused on basic identification data (age, sex, length of provided nursing care, and family relation of the care giver to the patient) was completed with Instrumental Activities of Daily Living Scale (IADL), Activities of Daily Living (ADL), and Nursing Burden Test by Svanborg [2]. To analyzed acquired results, we used descriptive statistics, like arithmetic average, standard deviation, and methodology of inductive statistics – Pearson correlation coefficient and analysis of variance test (ANOVA) with significance level $p < .05$.

1.2 Results of study

The survey sample consisted of 8 men and 52 women. The average age of respondents was 52.3 years; the average length of nursing care for the relative was 4.2 years. The survey has confirmed that 39% of respondents is highly dependent on others, 33% were medium-dependent. Other 25% of respondents were moderately dependent on others, and only 3% of the ill were totally independent (see Table 1).

Table 1 Characteristics of the Care Receiver

ADL	*n=60*	100%
highly dependent	23	39%
medium- dependent	20	33%
moderately dependent	15	25%
independent	2	3%
IADL		
dependent	32	53%
partially dependent	26	44%

Key: ADL- Barthel's Activities of Daily Living Scale, IADL- Instrumental Activities of Daily Living Scale.

Even 72% of respondent's/care givers consider nursing care for their relative to be obvious, something what is expected from them, 18% care for them based upon the wish of the relative, 8% do so due to a lack of vacancies in social establishments, and 2% do so due to distrust in social and health care establishments. Only 3% of respondents provide home care for their relative alone, without support of other persons. Most of families providing nursing care share their common household with the ill (77%). Based upon results, even 55% of relatives provide nursing care for the ill relative 24 hours a day, 35% of relatives are also employed, and 10% stated that they provide nursing care for half of a month, during

weekends, or other time periods. In Table 2we present the relation of burden of care giver regarding to selected, monitored variables (age, sex, length of nursing care, family relation to the chronically ill, level of self-sufficiency of the ill). It results from outcomes that burden of care giver statistically significantly correlates with ADL ($p < .01$), IADL ($p < .05$), whereas, also statistically significant difference in burden of care giver regarding their sex ($p < .01$) was confirmed. Nursing burden occurs most often in women than men. Statistical significance was not confirmed in our sample regarding age of care giver, length of nursing care, and family relation to the care receiver.

Table 2 Statistical Analysis of Selected Monitored Variables

Selected Variables	r	p
Age	0.0485	0.589
Sex	0.3356**	0.0035**
length of nursing	-0.1834	0.658
family relation to the care receiver	-0.0424	0.745
ADL	-0.3041**	0.0047**
IADL	-0.3518*	0.0385*
Key to significance of statistical outcomes * $p < .05$; ** $p < .01$; *** $p < .001$		

As nursing care for the relative with dementia is a very difficult task and influences not only people suffering from it, but also other members in the family, we investigated if family members are interested in using services in social establishments or services of home care agencies. Outcomes confirm that more than 50% of respondents are not interested in nursing services due to taking turns with other relatives when caring for the ill. 27% of respondents are interested in services in morning hours. Regarding overall perception of burden, in 53% of cases relatives stated psychical burden and 44% of them physical burden resulting from nursing care for the relative.

2 Discussion

Long-term nursing care for a person, who is not self-sufficient, is in many cases burdensome. Care giver feels burden in physical, psychical, leisure time, and financial area and feels it like obligation to their own family. Providing nursing care requires certain amount of knowledge, patience, and physical strength [3]. In our survey we focused on evaluation of burden of care giver when taking care for the ill with dementia in home milieu, regarding age, sex, length of nursing care, family relation to the ill with dementia, and level of self-efficiency of the ill. Rešetková states [4] how the family can function during time when a family member is ill. It depends in a large extent on the quality of relations before the disease occurred and already applied ways of stress management. It is necessary to provide help for care giver to avoid that nursing care be ultimate burden for them. It can be provided by means of social support, including family, friends, neighbors, co-workers, community, and professionals. It forms a system protecting people against harm influence of stress situations [5]. Several studies point out to the influence of length of nursing care on relations in the family, financial and social aspects [6, 7]. In our study the relation between burden of care giver and factors, like age, length of nursing care, family relation to the care receiver, has not confirmed. On the contrary, outcomes of our work show that burden of care giver correlates with the level of self-efficiency of the care receiver. This correlation was also confirmed in the study by Topinková [8]. Šerfelová and Hladeková [9] recorded in their work significant difference regarding family relation of care giver to the chronically ill, whereas high level of burden was perceived mainly by a spouse.

3 Conclusion

The goal was to map the level of nursing burdening families providing care for a sick relative with dementia. The investigation was carried out using non-standardized questionnaire for the local non-professional caregivers in number 60 respondents in the Presov´s region, which was supplemented by standardized questionnaires - Test instrumental daily activities - IADL, Activities daily living ADL, Test of nursing burden by Svanborg. The results from their search indicate the impact of burden on caregiver and on their psychological and physical aspects. Complex evaluation of both care receiver and care giver, making use of available evaluation tools and determination of correct nursing diagnosis may, in practice, help effectively solve the issue of burden of care giver when caring for the chronically ill [9]. The practice also calls for implementation of educational programs for care givers, as in our conditions similar projects are absent. And therefore, some families have insufficient conditions for this demanding task of providing nursing care for the chronically ill in home milieu. The aim of such complex approach is to increase the quality of life of not only the chronically ill, but of all family providing home care, as these two are inseparable, and necessarily influence each other.

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E-LEARNING IN ARTS AND CULTURAL HERITAGE EDUCATION

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Abstract: *As part of this project, an analysis of online educational offers of museums and galleries which use digital technology to present museum exhibitions and education will be performed. Based on the analysis, and the information obtained about digital technology in museum education, a didactic concept of an E-learning Platform based on the themes of the selected museum exhibition will be created. The E-learning Platform design should serve both as a possible stimulus for the further development of didactic content through online museum education and should provide a (experience) space for interactivity and self-study of the user of the Platform. The E-learning Platform and product are generally defined as a specific digital object or a more complex platform carrying educational content, which is transmitted to the user via digital messages and is accessible to a wide range of interested parties thanks to the Internet.*

Keywords: *E-learning, museum, education, pupils, digital technologies.*

1. Introduction

The project proposal will deal with the phenomenon of museums and galleries as an educational institution that develops its social mission.

Attention is paid to the significant development of museum pedagogy during measures against the spread of COVID19. Measures against the spread of COVID19 have suspended all cultural events and restricted social life. Teachers and museum educators were suddenly in a situation where they began to look for adequate ways to support children and adolescents during distance learning. Cultural institutions and museum educators began to discuss how to stay in contact with the audience in a situation where cultural life was suspended.

The project is based on ideas and outputs presented at an online conference entitled "Art Education in the Time of Coronavirus" by INSEA. The coronavirus has shown us – and it still shows that people do not control the world. The impact on people's lives and health or on the economy is devastating, yet every crisis situation is also an opportunity for reflection, internal transformation and inventing new ways to live, communicate, teach. We are witnessing a situation in which our plans and established ways of life – seemingly stable and solid – are rapidly falling apart. We've learned how fragile civilization is. Can we learn from this situation? Can we prepare for possible future crises? Are there support points on which we can rely in the future? [1]

Furthermore, the project is based on the fact that until now most teachers (museum lecturers) have rejected distance learning, at the same time educators have rejected (self) education in the field of digital literacy and have expressed concerns about the use of modern technology during education. It was the global crisis situation that prompted the development of virtual communication, which became the only way to continue teaching or to mediate museum collections and exhibitions.

1.1 Proposal for online art education

The first part of the project will deal with the analysis of online educational offers focused on the field of art and culture, e.g. online outputs of educational programmes of selected Czech museums and galleries. The project asks questions to which it will seek an answer throughout the implementation process: How do new digital technologies transform museum exposition/collections, how do they influence and reshape museum/art educational programmes, and how does the role of pupil involvement in educational programmes change?

The second part of the project will work with the identified information from the analysis on the use of digital technology in museum pedagogy and other educational institutions. In addition, in the project will be created a didactic concept of the E-learning platform, which will also provide methodological support for art education teachers. The design of the E-learning platform will be targeted at primary education pupils and should provide pupils with a different perspective on the acquisition of knowledge in the field of art and culture, in the form of "virtual" communication, creative stimuli and perception of experiences. Vision of E-learning focused on art and culture:

- E-learning should also be accessible and clear for parents and children themselves.
- E-learning should provide diverse learning materials and tips for teaching art education.
- Pupils should learn about art and culture (and our cultural heritage) through creativity, and it should be offered a creative journey, playful discovery.
- Offer interesting creative possibilities and offer a playful way to convey art and culture to children.
- Learning tasks and educational strategies should stimulate the development of children's creativity, the perception of the artefact, perception of himself and his surroundings through stimuli for reflection on artefacts.

- E-learning should offer space to get acquainted with Czech works of art and encourage the pupil to try to interpret the artefacts.
- E-learning should develop spiritual values and enable the pupil to understand historical changes.
- E-learning should teach pupils to understand art and culture as a specific way of cognition and communication.
- E-learning should create space for a stimulating "virtual" atmosphere for (self)education, creative activities, learning about museum collections, and artistic values in social and cultural contexts.

The design of the E-learning platform should serve both as a possible stimulus for the further development of didactic content through online art education, as well as provide (experientient) space for the interactivity and self-study of the user of that platform.

This project builds on a survey from the Czech School Inspectorate published in November 2020 entitled "Thematic Report – Support for the Development of Primary School Pupils in the Arts and Culture Educational Area", which presented the conclusions of the 3-year survey, here we learn about the very low participation of pupils in exhibitions and also we see low cooperation between schools and cultural institutions.

At the same time, we see in practice that most contemporary art education teachers do not work in teaching with online resources focused on the database of museum collections, and also teachers do not present online museum guides (e.g. virtual exhibitions) to pupils, they also do not use mobile applications aimed at presenting museum collection.

1.2 Forms of E-learning

Information and communication technologies began to significantly influence education and became part of life. The term E-learning has been used quite often and in many contexts in the field of education recently, but there are no clearly accepted diffusion and often the understanding of E-learning differs significantly.

E-learning can be characterized as an educational process in which information and communication technologies are used. The way in which ICT is used depends on the educational objectives and content, the nature of the educational environment, the needs and possibilities of all actors of the educational process.

An interesting option in ICT-supported education can be considered the so-called Blended learning, I.e. Mixed, full-time forms of teaching with E-learning [2].

Forms of E-learning:

1. Educational process associated with PC and software without networking (it is a home self-study).
2. E-learning connected with PC and network with educational objects presented on the Internet (educational process here uses didactic processed web pages other resources).
3. E-learning connected with PC, network and special learning software that allows so-called online learning.
4. Social online learning, which is associated with the use of social media for educational purposes (FB, Youtube).
5. Mobile learning, using shorter lessons (microlearning) [3].

1.3 Museum expositions as a source of information and space for discovery and education

Museum expositions have always been considered a source of knowledge and knowledge, and visiting the museum was a means of gaining knowledge of the world. The museum exhibition is educational through the museum collections (artefact), which is the main educational stimulus here. The museum exhibition can be defined as an environment that influences and transforms the visitor's opinion of the presented reality, shaping his awareness of the topic. Here it is appropriate: "The museum as an institution and as a spiritual value is a completely unique cultural and social phenomenon of our time." [4]

Museum exposition is a tool for education. Museum collections are used for cognition and education takes place using the perception of a unique experience. This unique experience is conveyed to visitors in various forms, e.g. in an interactive way using modern digital technologies.

Important research (or published publications) dealing with the issue of museum exposition, and the use of digital technologies in the museum, can be seen under the leadership of p.doc. P. Sobanova from Faculty of Education, Department of Art Education, Palacky University Olomouc. The research is focused on the Czech (and foreign) museum environment and mainly deals with the use of digital technology (i.e. information or educational mobile applications; creative PC games; use of tablets during educational programs; presentation of online collections and virtual museum expositions, etc.).

Furthermore, the research carried out in this area refer to case studies from foreign museums and galleries, which have been "interactive" for a long time and their use of digital technologies could be an inspiring stimulus for the "technological modernization" of Czech museums and galleries.

We can consider the following three types as groundbreaking and inspiring online educational museum projects in the Czech environment:

1. E-learning platform called "Virtual Archaeology", authored by Mgr. V. Mikesova. Virtual archaeology is part

of the Web portal Archaeology within reach and was created as an E-learning platform aimed at presenting and education of archaeological cultural heritage (focused on the collection of the National Museum in Prague, Fig. 1) [5].

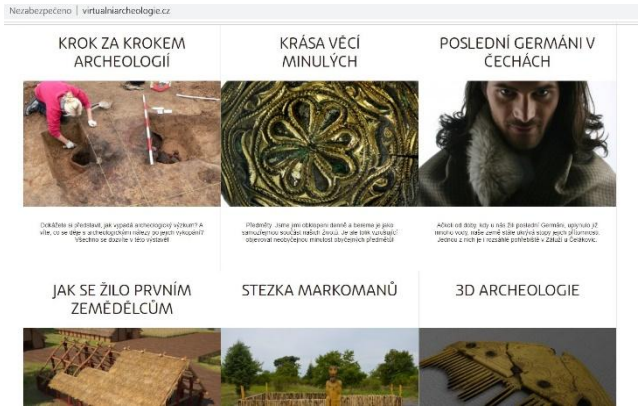

Figure 1: E-learning "Virtual Archaeology"

2. Interactive 3-year project "Touch the 20th Century" (2012-2015), which included attractive history teaching through the museum collections of the National Museum in Prague (not published).
3. An interesting project can be seen on the website of the Museum of Wallachia, which also contains educational games (Fig. 2) [6].

Figure 2: Online education on the website of the Museum of Wallachia

2. Theoretical-methodological basis

As part of this project, an analysis of the offered online educational offers by selected Czech museums and galleries for schools (not only during distance learning) which used new digital technology to present educational plans will be performed. Based on this analysis, and the information obtained about the use of digital technology in museum education, a didactic concept of the E-learning Platform for the museum exhibition focused on art collections will be created. The E-learning Platform design will be aimed at primary education pupils and should provide the pupils with a different view of gaining knowledge in the field of art and culture, in the form of virtual communication, creative stimuli and perception of experiences.

The project asks questions that will be answered throughout the implementation process: How do new digital technologies transform museum exposition, how do they influence and transform museum education programs, and how do the roles of pupil involvement change?

Project elements and content

1.Scientific problem:
E-learning in the educational field of art and culture.
2. Subject of examination:
Ways and forms of contemporary online education in art and culture with a focus on the education of primary school pupils.
3. To choose a methodology:
Analysis of didactic content of contemporary interactive and online educational outputs in the field of art and culture. The analysis will focus on the following points:

- Basic technical specification (e.g. year of origin).
- Classification (e.g. Type of education and primary goals of creators and purpose).
- Description (e.g. menu description; offered functions; multimedia)
- Content analysis of online education focused on art (monitor how educational content includes museum collection; how didactic content is chosen; imaginative didactic transformation; try to record possible shortcomings).
- Graphic evaluation (aesthetic quality and effectiveness; artistic solution; originality and exceptionality; work with text and color; adequate design for the target a group; readability of graphics).
- Evaluation of the functionality of the technical solution and design (functionality, simple orientation on the landing page; design of controls).

4. Research objective:

- Identify the types of E-learning platforms in the field of art and culture.
- Describe the didactic content of E-learning and its connection to the museum collection and cultural or historical area.
- Find out how didactic content is transformed into E-learning, and how the educational offering builds on art and culture.
- Use the new findings from the analysis to implement the didactic concept of the E-learning platform, which would be in the context of the educational area Art and Culture in primary school.

5. Research questions:

- What are the types of E-learning products and platforms of Czech cultural institutions and other educational institutions?
- How is didactic content transformed into selected E-learning?
- How to use the new findings to implement the didactic concept of E-learning focused on art and culture?

6. Research methods and research sample:

- Apply qualitative methods: qualitative analysis of online educational programmes of cultural and other institutions.

- Data collection: the basic sample will be the offer of Czech educational programmes, other cultural and educational institutions that have an online output.

7. Output:
Didactic concept of an E-learning platform for the educational field of art and culture with methodological support for primary school teachers.

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SPECIFIC EDUCATIONAL ASPECTS IN ITALIAN FAIRY TALES AND EARLY CARE

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Abstract: *The aim of the article is to present the collector of mainly Sicilian folk tales of the 19th century - Luigi Capuana (1839 - 1915) and the author of fairy tales of the 20th century Robert Piumini (1947). We present their lives as well as their work, while analyzing for each of them one selected work, which relates to the issue of education. These are the fairy tales The Golden Feather by Luigi Capuan and the fairy-tale novel Matthew and Grandpa by Robert Piumini. In the early family environment, the child gets an idea of what it means to live a good and fulfilled life, so at the end of the article we provide recommendations practice in connection with early care in families with potentially at risk individuals.*

Keywords: *Fairy tale, Luigi Capuana, Roberto Piumini, Education, Early Care.*

Introduction

The history of every human life is characteristically set in a number of traditions [1]. Through a fairy tale, children encounter a tradition [2], which is not only a source of security for the child, but a basic prerequisite for a dignified upbringing and culture [3].

In this article we present the life and fairy tale work of the authors *Luigi Capuana* and *Roberto Piumini.* We are aware that the life and work of each of them is a space for broad analysis, so we focus on only one fairy tale for each. We analyze it from the point of view of the educational influence in the family with an emphasis on early care.

1. Luigi Capuana

Luigi Capuana (1839 - 1915) was born in Sicily, Italy. At first he focused on poetry, later he devoted himself to literary criticism, which was connected with the advent of realism, which was characterized by hope for a new life [4]. He worked as a professor at the Universities of Rome and Catania, where he devoted himself to critical reflection and creative activity [5].

In his books, especially in novels such as Giacinta (1879), there is an interest in the psychologization of characters. In 1882, he published his first collection of fairy tales, which opened the door to literary works for children and young people entitled: *C'era una volta*. The book is full of insular Sicilian humor and rural naturalism.

He created Pinocchio's adventures at the same time as Carlo Collodi, which points to the growing interest in children's literature at a time when a united Italy was a young independent state full of social and economic differences between regions [6].

Capuana collected fairy tales from Sicily, but also worked with collected fairy tales by the collector Giuseppe Pitra, which he published in his book *Fiabe novelle e racconti popolari siciliani, raccolti ed illustrati* (1875). He wrote fairy tales in a unique linguistic form [7] and is said to have been so authentic in writing that several Italian ethnologists and literary scholars were convinced that he had only collected fairy tales.

Capuana's mastery of writing lies in the credibility of the text, and in the end he always writes as if he himself were a part of "*and we can only lick our fingers*" [8] or "*tell your story now, may I not be sad*" [9]. "*That evening a wedding took place and Reuccio and Tizzoncino lived happily ever after ... And our teeth chattered empty.*" [10]
In one of the answers, when asked why he started writing fairy tales, he said that one night he asked the good fairy Fantasy and she gave him three things: a ring, a black egg and a little snake. Thanks to these things, fairy tales began to come out of his mouth, and when it starts to happen, he has to call on the children to come and listen to him. He calls out: *fairy tales, children, fairy tales! Who wants to listen to fairy tales?*[11]

Fairy tale *Golden Feather*

One of Capuana's most beautiful fairy tales with a moral message [12], but also a depiction of the incorrect educational influence is the fairy tale *The Golden Feather* which was published in the collection of fairy tales [13]. It is the story of a beautiful princess who was very pampered by her parents. "*Once upon a time there was a king and a queen, who had a daughter as beautiful as the sun and the moon. However, she was so restless that when she did the trouble, she turned the whole royal palace upside down. How couldn't she be capricious and capricious if her parents never shouted at her. The bigger the mischief, the more they laughed*" [14]. As we show in the example, the parents just watched and laughed at the princess's whims.
Once a fairy disguised as an old woman came to the palace. Within her whims, the princess poured salt, black pepper, and burned the mallet on which the old woman was leaning, laughing a lot at it. The old woman was saddened, and the next day when she left, she said that the princess would be as light as a feather and the wind would carry her wherever it would blow. "*When she turned eighteen, she was a pretty girl with white skin and thick*

golden hair, but she weighed less than a feather and even a slight breeze carried her away" [15]. Since then, the princess has been called the Golden Feather. Fearing that she would not fly away, her parents closed the princess at home, and her only amusement was that she was floating to the ceiling as her parents blew intensely. To keep the princess from getting bored, her parents had to blow a lot until their faces lengthened. They would pay for it if the princess was normal again.

The Golden Feather successfully begged her parents to let her fly away, find the old woman and ask her for forgiveness. As she was light, the wind blew her away to one castle, where all was made of salt and black pepper. The cursed princess could only eat that. The Portuguese prince learned about her and decided to find her. With a magic bell, which he received as a courtesy for a help to one old man, he overcame difficulties and freed the Golden Feather. They happily returned home and she never wanted to eat salt and black pepper again [16].

The fairy tale shows how incorrect upbringing can harm a child and what a painful process leads to correction. At the same time, it turns out that a person cannot free him/her-self from such a curse and needs someone else, for whom he/she is precious.

2. Roberto Piumini

Roberto Piumini was born in 1947 in the province of Brescia in Italy. In 1970 he studied at the Faculty of Education of the Catholic University of Milan and devoted his final work to the poet Emmanuel Mounier. From 1967 to 1973 he was a teacher of literature in the province of Varese and led courses in movement and theatrical writing [17]. For three years he was an actor at Teatro Uomo di Milano and La Loggetta di Brescia. His first great success was his collection of children's rhymes, *C'era un bambino profumato di latte* (2012), suitable for children from the age of five, in which Piumini describes the moments of life in the poetic language [18].

Since 1978, he has published more than 70 books of fairy tales, short stories, stories, novels, rhymes, poems, theatrical texts, translations and adaptations in various Italian publishers. Together with children and teachers, Piumini dealt with folk literature, which resulted in the collection La capra Caterina (1984). He translated Shakespeare's works as John Milton's Lost Paradise and Plautus' Aulularia (2019). He writes novels for adults, short stories, texts for illustrations as well as commentaries on art catalogs.

He is the author of children's television programs, lyrics for contemporary music performers, as well as screenplays for short films. He writes accompanying texts for museums such as Palazzo Strozzi in Florence. With choir, singers, actors and musicians, accompanied by his son Michel playing guitar, he offers reading and reciting his own lyrics for children and adults. He has about fifty translations of his work abroad. His notable books include the fairy-tale novel *Matthew a Grandpa* (1993), bringing the issue of death closer to children, which literary critics consider to be one of the best novels for children [19]. We have chosen this story.

Fairy tale *Matthew and Grandpa*

The story begins in Matthew's family, where all the members stand by the bed. "*Grandpa is lying on the bed: very pale and weak. There is a mother, father, two uncles, six nephews and some other family friends around. Everyone is crying or about to cry, except for the youngest grandson, who is seven years old and his name is Matthew* "[20]. It is with Matthew that his grandfather unexpectedly starts talking and invites him for a walk. The rest of the family can't see it, and the two of them leave.

They go to a world where they experience many adventures, such as fishing together and so on. They come to the sea, where they are trapped by a group of pirates. Matthew and his grandfather found a tree in their wanderings, growing on a treasure, which sucked up gold with its roots and thus turned golden. The pirates want to know where the tree grows.

Matthew and grandpa do not want to reveal it, because they are afraid that the tree will be burned by pirates. Eventually, they manage to escape. Another important moment is when they find a grasshopper's armor on their travels. It is very beautiful and precious and grandpa donates it to Matthew.

They are slowly returning home while a strange thing is happening. Grandpa is getting smaller and smaller. In the end, he is as small as a seed and tries to breathe with all his strength. When they enter the house, they find everyone crying because their grandfather has already died. He, who is very small, tells Matthew not to be afraid, because they are only crying over his armor, but he (as a person) stays with them. When Matthew's father says in tears that his grandfather has died, Matthew opposes, claiming that grandpa is still alive and present with them.

Another lovely feature of the story is that each of the episodes ends with a sentence: "*the sky, as always in this story, was bright and full of light*" [21]. This story is one of the most beautiful texts that brings death closer to a child, conveying a message that nothing bad can really happen in life - not even death [22].

3. Recommendations and conclusion

In the early family environment, the child learns what it means to live a good and fulfilled life. Although the child does not understand everything that the parents ask for, with the trust he has in them, he perceives that it is good for him. Love can "magnetize" our feelings and desires, and so the actions of those we see become a model for us. "*In early education, whether using theoretical and methodological approaches or early bibliotherapy, the parent is the one who accompanies the child on the path of knowledge, inspires, helps him to understand the meaning*" [23].

In a friendly environment, full of confidence, the child is able to adopt guidelines, rules and laws. He gradually achieves control of his own emotionality, he is able to direct his own desires and subordinate his desire to the good of the family [24]. The child gradually realizes that his actions are in reciprocity with actions of other members of the family. A child who was until now locked in "*his comfort*", gradually recognizes his good in the context of the good of the family and in stories about the lives of others discovers that, feelings do not only make sense in themselves, but it is precisely anger, love and fear that can lead a person to a concrete action [25] and therefore we propose following:

Capuana's fairy tale inspires children to awaken the desire for good. In early care, we suggest using the work with a puppet [26]. In a dramatic action with an animated object, the client can uncover his own conflicts and their course. Playing life-related events related to conflicts is becoming a real part of puppet scenes [27]. The fairy tale *The Golden Feather* can be very appropriate. Like the Golden Feather's parents, who had to blow in order for the princess to rejoice, we can ask the child to suggest what the puppets should do to please him. It is also appropriate to discuss or philosophize with the children about what the princess's behavior was and what it brought her.

From the point of view of the present, Piumini's work carries deep ethical messages, which in a modern language show the child virtues, such as truth, joy, etc. The story of *Matthew and Grandpa* depicts the truth about man's death in a poetic way. Thanks to this fairy tale, death is presented as a part of every person's life. We suggest a simple game of truth within the framework of early care. If the therapist makes a true statement, the child will express whether it is true or not with some pre-agreed movement.
Fairy tales can in a timely manner help with the early care of a family with a child with a high-risk individual. They can deliver ethical messages where it is not possible to speak directly.

Afiliation: The paper is a partial outcome of the project *KEGA 013KU-4/2019 E-learning educational modules to the topic of early care for family with a child with risky development.*

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DRAMATIC AND MOVEMENT EXPRESSION OF A SONG FOR CHILDREN

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Abstract: *The presented paper offers practical examples of song dramatization, which can be applied to various educational activities not only within music and drama education. We place particular emphasis on linking vocal, dramatic and movement activities, which are often used in isolation in kindergartens. The dramatic and movement rendering of a song can also serve as motivation and enliven the lesson.*

Keywords: *song, dramatization, movement, integration, pre-primary education*

Introduction

Pre-primary education provides children the opportunity to get acquainted with songs, dramatization, movement, musical instruments and listening, through which they acquire basic knowledge of music and drama education. Vocal activities form the basis for the development of tonal and rhythmic feeling, musical imagination and memory. At the same time, they participate in the development of vocal skills and habits. Pre-school children are characterized by spontaneous musical and movement expressions, which are their natural reaction to external stimuli. These motivate the child to perform various activities, the basis of which is a game. In kindergarten, working with a song is often utilized in music education. The children learn well-known folk and author songs and create their own collection, which will expand in further education.

1. Working with a song

The teacher sings the unknown song first, then learns the words with the children. If parts of the text rhyme, children tend to remember them more quickly. The children also learn the verses of the song by rhythmizing or clapping, which also exercises their perception of rhythm. When the children retain the melody, we accompany it with a musical instrument. By improvising on the instrument, as well as body play, children can express individual situations, characters, story themes or tell the content of a song without words. The song can be accompanied by playing Orff instruments (rhythmic or melodic). These tools are both easy to use and most suitable for preschool children. Other objects that create sounds can also be utilized as a musical instrument, such as a plastic bottle, kitchen utensils (spoons, graters and covers), paper, sheet metal, plastic bags, pebbles or branches. When mastering the instrumental accompaniment, we name the musical instruments so that the children can consolidate their names. First, we allow them, through improvisation, to play the accompaniment to the song the way they feel. Of course, there might be noise, possibly chaos. This is the reason why we lead the children to the point that the music cannot be so noisy and that is why the children play the accompaniment gradually. [1]

The movement expression of the song is based on the spontaneous expression of children. It leads them to a cultivated movement harmonized with the music, rhythm and content of the songs. We can use movements on the spot - bending and stretching, squatting, turns, turning the hips, stomps, various simple swing movements, body play; or movements with progress into space – one step, two steps (which can be enriched with simple bouncing), walking, running, hops, gallop sideways / forward / backward. [2] The second option – movement in space, in addition to dancing, also develops children's ability to orient themselves in space. We can use movement forward, backward, sideways, alternate levels (on the ground, on all fours, standing) and formations (in a circle, in a row, in a line), children can dance individually, in pairs or in a group. In individual movement activities we use elementary movement improvisation to music, improvisation with assignments (movement on the spot / in space) with an emphasis on inspiration based on the musical background, or we compile a simple dance, respecting the form of the song and cultivated body movements

2. Dramatization of a song

Dramatic education is reflected in the work with the lyrics of the song, which is explained to the children followed by a demonstration. It is advisable to choose a song that is simple, attractive and thematically close to children. Not every song is suitable for dramatization.

The process of dramatizing a song:

1. Choosing a song

When choosing a song, we take into account the age peculiarities of children, musical experience, singing skills and interests of children, the character and structure of the song, vocal range, rhythm, tempo, intonation skills, or the current theme of the lesson. Folk songs are also suitable because they have appropriate musical construction elements (rhythm, melody, vocal range), they are an expression of the musical feeling of ordinary folk artists, they have been proven and selected by ages, and to this day only the most popular ones have been preserved and translated. [3]

2. Song analysis
After the children got acquainted with the melody and lyrics of the song, an analysis of the content on which the dramatization will be based follows. During the discussion, the children come up with many interesting answers and ideas that can become an inspiration for further activities with dramatic elements. We will analyze the lyrics of the song so that the children can grasp it. We focus on what happened in it, why it happened, who appeared in it, the characters, what characteristics they had, what the author wanted to tell us, what lessons can be learned from it. We talk about what emotions the song evoked in us. We talk about the mood of the song and the characters that appear in the story. We are looking for motivation for their actions, which led them to their actions. [4]

3. Playing a song
If we make sure that the children understand the content of the song, we can continue to work with it. Working with the lyrics of the song is diverse. We can focus on the situation that happened before the song, continue to play it, or show the situation after the song. Children can play out short stage formations or portray the main characters in the form of live sculptures. Another option is to accompany the singing of the song with a pantomime. [5]

3. Songs suitable for dramatization [6]
Songs about animals
Bola babka; Maličká som; Krásna, krásna, Medveďku, daj labku; Skáče žaba; Na dvore býva sliepočka naša; Kukulienka, kde si bola; Po nábreží koník beží etc.
Children songs
Pec nám spadla; Tancuj, tancuj; Fašiangy, Turíce; Červený kacheľ; Červené jabĺčko; Ak si šťastný, Spi dieťatko etc.;
Children's movement games
Kolo, kolo mlynské; Oli, Oli Janko; Medveďku, daj labku; Zajačik do lesa; Tancovala babka s dedkom; Ľavá nôžka, pravá nôžka; My sme malí muzikanti; Čížiček, čížiček; Mám ručníček, mám; Zlatá brána etc..

Kukulienka (traditional slovak folk song)
Before dramatizing the song, we introduce the children to the situation in the winter forest with a short descriptive narration. We suggest that they play cuckoo and snowflake together. The children are marked with the headbands they created in the morning and divided into:

- trees: individually (in a straddle stand, which represents a den) or in pairs (turned back to back, with hands up) imitating a forest. During the song, they imitate the movement of the branches in the wind;
- kukulienka: "sitting" in the thicket (under the friend's crouched legs), waking up with the words: "hajajaj kuku".
- snowflakes: at the beginning of the dramatization, sitting clustered on the carpet, to the music they begin to slowly dance in space with the idea of being gently carried away by the wind. They are looking for a way between the trees in the forest by using graceful walking or running on round paths, turns and hops with accompanying arm movements [7] (care must be taken to ensure that children perceive other "flakes" and "trees" in space and adjust their path accordingly to they did not collide). At the words hajaj kuku they find a cuckoo and as the snowflake gently hits the ground, they descend to the cuckoo and wake it with a touch. Then they dance again in the space out of the forest, finishing the dance improvisation by sitting back on the carpet.

Spi dieťatko (traditional slovak folk song)
Lullaby is one of the basic types that preschool children encounter and are aware of its function. They realize that a lullaby helps put a baby or doll to sleep. We can expand this experience knowing that this song expresses the affection, tenderness and the mother's love for the child. We carry out the activity in a quiet, pleasant atmosphere. Our performance should also be calm, gentle, ideally on piano. We will also focus on the issue of the performance in a discussion about the song. We will elaborate on how to sing it so that the baby drifts away. After mastering the song, we will involve other activities. We can enrich the song with a gentle rhythmic accompaniment. A group of children can whisper the words "spi že" (sleep) in the rhythm of quarter notes. [8] We can include dramatization in the form of depicting the child's sleep to the instrumental accompaniment. We will use favorite toys or we can make puppets. We put them to sleep during the song with a pendulous movement. In the movement portrayal, we can give children the idea that they are little elves in the forest, who carry a light in the middle of their chest, which shines far ahead during the day, but goes out when they fall asleep. The feeling of the light emitting stimulates the children to extend their spine vertically and when they are released into the forward bend or curled into a ball (fall asleep) the light goes out. We play or sing the first verse of the lullaby. Children dance in space, using elevated movements while sitting, standing and walking with the light on, i.e. in a vertical body position. They shine on the road with the light, when they meet a friend, they show each other the lights (stand opposite each other), and then they turn their backs on each other - they shine on the road for the next meet up. The movement may be more dynamic at first, and gradually the movements slow down due to the gentle tones of the lullaby. At the beginning of the second verse (we can highlight this moment by striking the triangle), the elves will slowly find a place in the forest where they will fall asleep and turn off their lights. [9] We can repeat the task, or divide the children into two groups at the beginning. One group first sings with the teacher, the other group dances and then they exchange.

Maličká som (traditional slovak folk song)
We will introduce the theme of the song to the children and tell them the story of how the girls from the village used to go to graze geese in the green meadows. As a pastime, they made and wore wreaths of flowers and sang to each other. Most often they sang the song Maličká som. Right after learning the first verse, we can complement the

singing with simple movements - one step, two steps, turning, squatting, jumps. Children can stand in a row or be arranged to position themselves in the chessboard pattern (each child has its own space).

Movement combination:
Bar 1: squat down, closing an arch with hands,
Bar 2: stand up, opening hands in an arch,
Bar 3: one step to the right,
Bar 4: one step to the left,
5th and 6th bar: two steps to the right,
7th and 8th bars: one turn around the axis to the right with a backside kicks, hands sideways,
9th and 10th bars: two steps to the left,
11th and 12th bars: one turn around the axis to the left with a backside kicks, hands sideways,
We can add a simple variation to the second verse:
5th and 6th bar: 3x gallop sideways to the right,
7th and 8th bars: 4 steps following the left hand with rotation around the axis,
9th and 10th bar: 3x gallop sideways to the left,
11th and 12th bars: 4 steps following the right hand with rotation around the axis.
The third verse will contain the same movements as the first verse to better grasp and remember the dance combination.

4. Conclusion

Working with a song is the most commonly used form of acquiring various competencies in pre-primary education. The learning of well-known melodies of folk and author songs takes place through vocal, instrumental (using Orff's instruments), movement and music and drama activities. Combining these activities into one activity is a suitable way to develop several abilities and skills (rhythmic feeling, perceptual and instrumental skills, the ability to control and process emotions and functioning in a group). We selected children's songs for integrative activities. We carry out individual activities in the form of a game, thus ensuring active participation during the entire educational process. Due to the integrative approach, we have a positive effect on the development of the child's holistic personality.

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SATISFACTION WITH HEALTH AND QUALITY OF LIFE OF SENIORS

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Abstract: *Aim. We aimed to find out whether the quality of life of seniors is higher in either home or institutional environment. Methods. We´d realized the on the sample of 128 seniors living in institutional and home environment. We studied their quality of life via structured questionnaire WHOQL - BREF. Results. The achieved results show correlation between satisfaction with the health and perception of quality of life. We found out, that quality of life of elderly living in their homes is higher than of those living in institutional environment. In the home environment, the average value of the quality of life was 14.8 ± 10 and in the institutional environment it was 12.8 ± 11.09. The respondents from home environment reported better quality of life than respondents in the institutional environment. Conclusion. The support of quality of life should be one of the basic aims of nursing care. Nurses should make early identification of negative factors affecting quality of life and eliminate them by suitable nursing interventions.*

Keywords: *quality of life, seniors, satisfaction with health, physical pain*

1. Introduction

Providing care for seniors requires certain amount of knowledge, patience, and physical strength. Long-term nursing care for a person, who is not self-sufficient, is in many cases burdensome. The objective of institutionalized nursing care facilities is primarily activation of the client and maintaining his/her self-sufficiency for the longest possible time and as much as possible. But an individual approach and respect for fundamental human rights and freedoms must also be present. The priority of seniors is acceptance of their state of health and current life situation to the greatest extent possible [1]. The physical and mental quality of the individual gradually decline and old age is burdened by polymorbidity and deterioration of physical fitness and self-sufficiency. For seniors living at home and in the institutional environment the ability to be independent is a very important factor that affects their quality of life [2].

The aim of the study was to compare the of quality of life for the elderly at home and in the institutional environment. Within each subscale, we evaluated the feeling of satisfaction with health as part of the quality of life of seniors living in institutional environments and seniors living at home. We examined the extent to which physical pain affects the mobility of both groups studied (seniors living in institutional environments and seniors living at home).

1.1 Methodology

In this work we used the WHOQL - BREF standardized questionnaire of quality of life. The results of the WHOQOL-BREF questionnaire are expressed as domain scores and the values of answers under two separate headings. Domain scores are an average gross score calculated from the relevant items, including normalization to a range of 4-20 or 0-100 (given in %). The answers under two separate headings assess quality of life and overall health [3]. For the statistical processing of data, we used SPSS 18.00 and Microsoft Office Excel 2010. The individual statistical results for domains were compared with the given intervals for the population domain on the WHOQL-BREF questionnaire. Study was conducted on a sample of 130 seniors living in institutions and at home. Of the respondents, a total were 86.4% of women and 15.6% men. The average age of respondents was 81 years.

1.2 Results

Significantly indicative results were recorded in the satisfaction with health subscale where the values of confidence levels (0.593) were found among respondents from home environment in this subscale. This is confirmed by the comparison of averages in the sample (for respondents in the home environment, mean = 2.78, and for respondents in the institutional environment, mean = 2.93). The achieved results show correlation between satisfaction with the health and perception of quality of life (Tab. 1).

Table 1 Satisfaction with health and quality of life

	Satisfaction with health		*Quality of life*	
	Institutional environment	*Home environment*	*Institutional environment*	*Home environment*
ME	12	15,50	8	10
SD	9,41	3,74	11,09	10,30
HS	1,169	0,593	1,378	1,279
M	2,78	2,93	2,60	2,62

In evaluating the subscales of mobility, we found changes in the confidence level (Tab. 2). In the institutional environment SD = 4.03 in the subscale of physical pain and in the subscale of mobility SD = 8.53. The achieved results show a better level of mobility among respondents

at home, and also indicate the impact of pain on physical mobility of respondents.

Table 2 Physical pain and mobility

	Physical pain		*Mobility*	
	Institutional environment	*Home environment*	*Institutional environment*	*Home environment*
ME	12	13	12	12
SD	4,03	5,31	8,53	3,82
HS	0,641	0,845	1,358	0,609
M	2,75	3,00	2,62	3,00

For the sake of a comprehensive understanding of the issue of the quality of life of seniors in the population, we conducted a comparison of findings in various domains with the standard population norms in the WHOQL-BREF questionnaire from Dragomirecká and Bartoňová, 2006. We then compared these domains in the institutional environment and at home (Tab. 3).

Table 3 Comparison of domains in the institutional and home environments

		Average	*Institutional environment*	*Home environment*
domain 1	physical health	15,55	16,37	16,63
domain 2	mental health	14,78	16,71	17,02
domain 3	social relations	14,98	14,43	14,74
domain 4	environmental conditions	13,30	15,17	14,94
Q 1	quality of life	3,82	2,78	2,93
Q 2	satisfaction with health	3,68	2,60	2,62

Using the WHOQOL-BREF questionnaire, we found that in the domain of physical health (presence of pain, degree of mobility, fatigue, loss of energy, the ability to do work, self-reliance, the need for frequent medical attention) the final domain score was 16.63 at home and 16.37 in the institutional environment (on a scale of 4-20). This means that the scores for the two environments are in the interval of standard average and standard lower limit of the range. The scores found in our research are lowered compared with population norms. Our results also confirm research aimed to evaluate the quality of life of seniors in community settings [4], which found equally reduced physical health scores (11.7).

Good social functioning with maintaining existing relationships is significant for the perception of good quality of life, contributing to a sense of personal security. The scores found in the domain of social relations in our group were 14.74 for the home environment and 14.43 for the institutional environment (on a scale of 4-20) which just as for physical health is in the interval of the norm of the average and the interval of the norm of the lower bound. The results found in our study are, similar to the group of respondents of in the study by Farský et al., reduced in comparison to population norms [4].

We found the highest scores in the domain of environment, which evaluates not only the natural environment but also the availability of adequate health care, access to information and the opportunity to realize their interests. In the institutional environment the domain score was 15.17 and in the home environment the score was 14.94 (on a scale 4-20). Compared with standard average from Dragomirecká and Bartoňová [3], these values are in the interval of the norm of the upper bound and the interval of the slightly increased bound, which represents an increase of reference values. Excellent scores in the domain environment are not typical only for the senior population.

2. Discussion

The quality of life is closely linked with the quality of health; it is multidimensional and represents an individual's overall perception of the disease itself or his treatment. The research results showed that respondents rated the quality of life most often as average (47.65% of respondents). Approximately a quarter of respondents (25.78%) rated their quality of life as good, but 13.28% of respondents stated their quality of life as very bad. Compared to the average values of quality of life, there was a significantly greater difference between the results. In the home environment, the average value of the quality of life was 14.8 ± 10 and in the institutional environment it was 12.8 ± 11.09. We can conclude that respondents from home environment reported better quality of life than respondents in the institutional environment. Other studies [5], [6], focusing on the quality of life of seniors agree in saying that potential health greatly influences the quality of life. Research conducted in Finland which evaluated the quality of life of seniors by examining health, functional status, demographic changes and income levels has led to the conclusion that the quality of life of seniors is higher in the home environment than in old people's homes [7]. Wilhelmson et al. conducted a study in Sweden (Gothenburg) which surveyed seniors over 65 years of age on their perception of quality of life. Excluding criteria of the research were social factors, poor health and lack of interest. Interviews were conducted using a semi-structured questionnaire for 138 people (77 men and 61 women) and an evaluation of disability. Priority in the research was attributed to social relations, health, activity, functional capacity, wellbeing, personal beliefs and attitudes. The study confirmed the fact that social relations, functional ability and activity affect the quality of life of seniors to the same extent as their health status [8].

Currently, about 650 million people over the age of 65 live in the world. In 2050, for the first time in human history there will be more seniors than children under 15, and one in five people in the world will be a senior. At the present rate, seniors over 65 will make up 35% of the population of Slovakia in about 50 years. With an ageing population and improved quality of health care, the needs of seniors' lives have changed and there is now an assumption of

integration through active ageing. Due to the fact that old age is accompanied by polymorbidity, physical pain in the elderly is relatively common phenomenon of old age. Chronic pain can lead to functional and cognitive decline, reduced mobility or flexibility of the senior. The average value of the subscale of pain in seniors in the home environment reached the level of 13.25 ± 5.31 and for seniors in the institutional environment, 13.75 ± 4.03. On the basis of the results it can be concluded that pain to a greater degree limits the respondents in the institutional environment.

The level of physical performance greatly affects mobility in old age, flexibility and preventing falls. By comparison of average values of the subscale of mobility, which in the home environment were 13 ± 3.82 and in the institutional environment, 12.75 ± 8.53, we concluded that respondents in the home have a higher degree of mobility than respondents in the institutional environment. The results of research aimed at finding the quality of life of seniors in hospitals and social care institutions [9], which was implemented in the Presov region, were interesting. When evaluating the field of mobility, residents of social care institutions showed lower rates of assistance in the ADL test (M = 2.64) than geriatric patients (M = 2.33). The reason was the use of assistive devices, the use of which in hospitals is lacking. ADL test results evaluated the self-sufficiency of people surveyed whereby worse results were seen in geriatric patients (ADL gross score = 5.82) than in the population of facilities for the elderly (ADL gross score = 3.53). The findings confirmed a significant dependence on the level of self-sufficiency for the quality of life of seniors, which was researched to a significance level of $p < 0.001$.

Physical activity significantly increases physical performance, as demonstrated by the research of Hornakova implemented in Zlín, Czech Republic. In the study on a sample of 188 seniors it was found that 22% of seniors living at home and 21% of those living in social institutions reported improved physical fitness from the performance of physical activity. It was also interesting that physical activity brought positive aspects not only in relation to their physical condition or state of chronic disease. Up to 53% of seniors said exercise improved their mood and 31% stated that their memory and thinking improved. The above findings suggest that it is important to encourage seniors to experience an active old age. In facilities for seniors a priority objective should be achieving the most effective mobility of clients through rehabilitation procedures (diadynamic therapy, magnetic therapy, application of paraffin wraps, massage, respiratory gymnastics, physiotherapy, etc.) [10]. For clients of the facility there should be available a gymnasium where group therapy takes place under the supervision of a physiotherapist. For achieving the best mobility, a variety of mobility aids should be used (walking frame, forearm crutches, walkway with bars etc.).

3. Conculssion

The decline in the quality of life of seniors may be expressed in the presence and absence of negative feelings or the meaning of life. The effectiveness of the intervention of social and health institutions would yield benefits for this vulnerable group in society. A beneficial solution in the future seems to be the creation of day centres for seniors, a kind of replica of kindergarten for that community, in that it substitutes for the absence of relatives during the day and at the same time to provides for personal contact for seniors with their families (during the morning, evening hours and weekends). The geriatric age is characterized by many specifics; however the satisfaction of hospitalized clients is an important indicator of quality of care from the perspective of nursing.

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THE COMMUNICATION OF THE ELDERLY WITH MEDICAL DOCTORS DURING THE CURRENT PANDEMIC

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Abstract: *During the COVID-19 pandemic, we have encountered a phenomenon, in which everyday communication (school, work, handling of official affairs) has shifted more into the digital space. This shift also affected the medical discourse, where consultations and examinations began to be handled by telephone or e-mail. Healthcare information is available on doctors' websites and is constantly updated. However, the elderly who are not used to information and communication technologies to the same extent as younger people, have not been prepared for this form of communication, or this form of obtaining information, which may lead to digital and information exclusion of the older generation. Our paper aims to look at how seniors obtain information in the medical discourse.*

Keywords: *the elderly, medical discourse, digitalisation, Coronavirus, exclusion.*

1. Introduction

The current era we are living in is also referred to as the Digital Era of the Fourth Industrial Revolution. The spread of the Internet around the world has given rise to online spaces that focus on various areas of life with the potential to improve the health, cognitive, social, and emotional well-being of people. In these times of the COVID-19 pandemic (which has been spreading in the Slovak Republic since March 2020 when the first positive case was announced), the need for digitalisation of households has increased even more, as not only teaching has moved from schools to homes, but also work when possible in the form of the so-called "home office". Most social interactions have moved to the virtual space. Family and friends have been meeting via video calls to keep the virus from spreading. Visits to hospitals and assisted living facilities have been prohibited since 6 March 2020. Official institutions have handled clients via email or telephone, and requests and forms can be submitted electronically. This sphere of official institutions also includes doctors who under usual circumstances come into direct interaction with their clients/patients, e.g. during examinations or consultations. Medical discourse has also shifted to non-contact forms of communication. The already mentioned examinations also started to be executed by phone or e-mail.

The object of our paper is the influence of digitalisation on the interaction between the layman (senior) and the professional (who can be a medical doctor, a nurse, etc.) in the medical discourse. We have decided to focus on seniors because this phenomenon can lead to digital, informational, but also the social exclusion of the elderly, and it can cause health complications due to the lack of information about their health condition and the lack of routine examinations.

1.1 The digitalisation of the medical discourse

At present, information and communication technologies are influencing the dynamics of interaction in the medical discourse under the pressure of the global situation associated with the COVID-19 pandemic, which has "introduced" several regulative measures, changes, and bans or orders. The communication behaviour *during the COVID-19 pandemic* includes the ways in which a person can get medical consultation (with their general practitioner or a new physician/surgeon when dealing with a newly arisen medical problem to receive verified information about a specific health issue). Personal contact has been replaced firstly by telephone consultation: patient first talks to a nurse during the administrative part of the interview (they find out if their appointment is still valid; if they should/can come to see the doctor; they ask for an electronic prescription); the professional consultation is then taken over by a doctor, who informs the patient about the results of the tests and the continuation of treatment. This form of communication was also utilised before the pandemic, but it was only used during the first, administrative part. Currently, telephone communication is also being carried out in place of in-person consultation with a doctor, during which the doctor examines the patient and recommends the necessary medicine for the treatment of a specific health problem; secondly, there is the e-mail consultation, which takes place analogously to the telephone communication. The third way of obtaining information is the online consultation – see website lekar.sk where one can chat with professionals [9]. Medical professionals offer a broad spectrum of medical and pharmaceutical themes on their websites and social media accounts in the form of articles and comments and their readers can interact with them and react to them, e.g. lekar.sk/online-lekar. The site also has accounts on Facebook and Instagram. The fourth way is the audiovisual means of sharing medical and pharmaceutical themes that have arisen especially in the form of podcasts

(that have an informative and entertaining character and are realised in a popularising form), e.g. *Bez Receptu* (*Without Prescription*) – a podcast about health with 2 pharmacists and their guests [8]; *Doktor má Filipa* – a podcast about the themes "behind the doors of an examination room" with a doctor, a male nurse, and their gu€sts [11]; *Zdravie* (*Health*) – a podcast focused on themes dealing with health and the health system (podcasts apple.com). The authors naturally deal with the theme of COVID-19, the immune system, PCR tests, vaccination, and new virus mutations in specific episodes and thus offer information *about the pandemic in the medical discourse*.
We can state that the primary contact in the medical discourse currently does not happen via personal communication but via ICT (information and communication technologies). A person that needs to resolve their health issues by consulting a doctor first either calls their doctor's office, sends an e-mail, or checks the doctor's website to find out whether the doctor is available, whether the patient can come in person, or the doctor recommends medication or writes an "e-prescription" that the patient does not have to pick up in person. So the scheme changes from "I have a problem – I'm going to see a doctor", to "I have a problem – I'll call the doctor/look on the Internet to see if I can come at all". If the information is provided only on the doctor's website, this can be a problem for seniors who do not have access to the Internet or are not digitally and informationally literate enough to obtain this information over the Internet.

2. Communication of the elderly via information technologies

Seniors, in this paper, denote the elderly people who are usually retired (they do not work) and are passive, which affects their social isolation and contributes to the fact that they do not "keep up" and do not acquire activities and skills common for younger generations, e.g. computer skills, communication via social media [1]. In professional literature, seniors are referred to as digital immigrants [2]. One of the characteristics of these people is computer or technological illiteracy. On the other hand, people who have grown up in the era of media, are referred to as digital natives a thus have more developed digital, technical skills, they can use e-services, etc. These authors also mention the term digital exclusion or information (digital) divide. The term digital exclusion means the exclusion of people who do not have access to information and communication technologies or are less digitally literate and based on that do not have equal access to ICT. The digital divide occurs among digital natives and digital immigrants and it occurs mainly between the younger and the older generations. Schools improve critical thinking and reading comprehension in the younger generation helping them to prepare for the disinformation and hoaxes spreading in the virtual space and thus making the younger generation more resilient. On the other hand, older people were not prepared for information and communication technologies and so they are more prone to succumb to commercial or information disinformation. On 9 February 2021 (Safer Internet Day) the Police Force of the Slovak Republic posted on its official Facebook site information that according to the analysis of various posts on Facebook: "the older generation largely shares various hoaxes. There are specific examples when grandmas use coarse vulgar language in verbal fights under their posts (hoaxes) while their profile pictures are their photos with their grandchildren" [3] Facebook, the Police Force of the Slovak Republic, 9 February 2021, op. cit. 17 February 2021). The Police also warn that it is not rare that a post by a senior can have more than 1000 shares and the disinformation becomes "viral" (it is quickly spreading in the virtual space). In this context, it seems very important to increase the digital and informational competencies of seniors. It is not enough to improve their digital skills so seniors can work with ICT and search for information, but also to develop information competence related to critical thinking so that seniors can distinguish true information from misinformation. Thus, digital competence goes hand in hand with media and reading literacy that needs to be developed in seniors so that they can utilise the positive and useful aspects of the virtual space. The development of digital literacy at an older age can have a positive effect on practical (using e-services, which is very important in times of pandemic; receiving information about health – health literacy), developmental (improving digital competencies and thus one's self-worth), and social (communication with family, friends via the Internet) skills of the elderly, which are very important in times of pandemic [5]. Various studies [6], [7] also show that working with information technologies contributes not only to the development of motor skills, but also perceptual, cognitive, and affective skills of seniors.

2.1 Communication of institutions with the public

We can notice the language aspect in the methodological guidelines for individual health departments on the website of the Ministry of Health of the Slovak Republic [10], which contain recommendations that if a patient does not have coronavirus "they can enter the surgery only when wearing a protective barrier on their face (a mask or at least a scarf or something similar)" [4].

The internet website praktickaambulancia.sk [13] contains information according to which we should not visit doctors in person but use telephone or online consultation. The information on the website further says that doctors prefer e-mail communication and also advise patients to come only in emergencies.

We can cite the experience of one of our respondents that confirms this phenomenon. He accompanied his father for an examination due to severe pain in his ear. The nurse reacted authoritatively – stressing that they should have called first to find out whether it was not enough to prescribe medication, and they certainly should not have come "unannounced" to the surgery and expose themselves to the risk of infection.

We, therefore, perceive significant differences in the communication of the Ministry of Health and the

communication of individual surgeries and their staff. While the Ministry of Health of the Slovak Republic makes a recommendation and offers the possibility, the surgeries announce in a rather directive way that people should not go to the outpatient clinics or surgeries in person and should contact their doctors via e-mail.

2.2 Research on communication of seniors within the medical discourse

While more active or still working older people (over 65) may not have a problem with the use of ICT and obtaining information, a more passive senior may also have a problem with basic functions. Therefore, we decided to conduct research, in which we found out how seniors obtain information in the medical discourse. Our research involved 19 female respondents, of which the first two were nurses in assisted living facilities. They represented people over the age of 65 who are active but can provide us with information about seniors' communication in the assisted living facilities, where they work. We need to emphasise that we do not generalize the results of our research; it is just a probe to obtain information from a small number of informants.

The interpretation of the results

I. The communication in the time of coronavirus within the medical discourse has shifted to non-contact forms of communication. The first two respondents are nurses in assisted living facilities. Respondent no. 1 stated that she is in contact with doctors by telephone or e-mail. Respondent no. 2 stated that she is in touch with doctors only via telephone. This is the way these respondents consult the health of their clients. In urgent cases, of course, are seniors taken to hospital. Respondent no. 3 has not been at a medical check-up since March 2020 (normally, she goes for a check-up twice a year), she consulted with a nurse via telephone and she was informed that the doctor does not hold surgery, until further notice, and deals only with acute cases.

II. People obtain information from the online space. Respondent no. 1 is a medical nurse so she naturally stated that her sources of information also include "professional magazines like *Sestra*, *Šanca*, and medical newspapers", but she added that currently, she is obtaining further information from websites "korona.gov; the Ministry of Labor, Social Affairs and Family of the Slovak Republic; the Ministry of Health of the Slovak Republic, Office of the Government; the Public Health Authority of the Slovak Republic, or regional hygiene". Respondent no. 2 also stated that she obtains information from these websites. We can see that active older people obtain information from ICT. These nurses then share the information from the websites with the clients of their assisted living facilities. Important is the finding that other respondents, seniors also obtain information about regulations and health services from their acquaintances and family members. Younger family members obtain the relevant information and share it with their older relatives. The seniors in assisted living facilities differ in this aspect because they receive the relevant information from the medical staff of the facility, e.g. nurse, assistant nurse, etc. We can state that seniors receive information also through other people, either from their family members or medical staff of the facility where they live. 7 respondents stated that they receive information about personal protection against COVID-19 from podcasts.

III. People come into contact with doctors only in acute emergencies as non-acute cases have been "on hold" due to COVID-19.

Respondent no. 1 stated that seniors go to see a doctor only in "rare acute instances, but that has been minimised to a minimum". Respondent no. 2 stated that "personal contact is more difficult due to the restricted movement. Only acute health problems are being dealt with because there is the fear of Covid in medical facilities". Respondent no. 3 stated that she has not been in contact with her doctor throughout the year, but from all the planned examinations only her blood sample was taken by a nurse. Respondent no. 4 experienced difficulties with dental care – she had to persuade a dental nurse to make her an appointment. Respondent no. 5 goes once a year for an ultrasound scan (her last visit was in 2019). She was informed by a nurse that ultrasound scans were presently not being done. She went to a routine check-up and her general practitioner sent her to an ultrasound scan (of a different organ) and she was given an appointment without any difficulties. "I do not understand such regulations, when one surgery is closed but another one is open and they have no problem to examine a patient." The respondents also stated positive experiences when they made an appointment by phone, the waiting room was almost empty and the doctor saw them almost without waiting and talked to them in a very friendly manner (asked them how they were and if everything was all right).

IV. Seniors have lower digital competence, ie they do not know how to receive information from the online space like younger people, which leads to limited opportunities to contact a doctor and can cause deterioration in the health of the affected seniors.

Regarding the first two respondents, it should be noted that the assisted living facilities try to provide health care to their clients, they also obtain information from the Internet for them and, if necessary, the clients are transported to the hospital. Respondent no. 6 belongs to the "category" of people over 65 years of age and from the statement of the Minister of Health and information published on the Internet (especially the websites of newspapers) knows that people over 65 years of age are not recommended to go for testing and do not need a negative test to get health care (check-ups). Despite the recommendation, the respondent went to be tested. At the doctor's surgery, the nurse's first reaction was, "Do you have a negative test?" to which the respondent said: "I do not need to have a test for an examination and I am over 65 years old." The nurse did not accept her reasoning. The respondent pointed out that she did not say that she did not have a test, but that she

did not need it, so she did not understand why they wanted her to have it.

3. Conclusions

Various programs, state interventions aimed at increasing digital literacy among older people throughout Slovakia and in various social classes of seniors could contribute to the social inclusion of seniors in the current digital era. This group of the population is heterogeneous, educationally, in terms of activity/passivity, in terms of language competencies, etc. Although there is a University of the Third Age, e.g. within the Center for Further Education of Comenius University in Bratislava whose classes were interrupted during the pandemic and switched to online classes in January 2021, it is relevant only for a small part of seniors who were accustomed to an active way of life even before the pandemic, i.e. active seniors. It is important to add that while before the pandemic, approximately 2,000 seniors were educated annually at the University of the Third Age of the Center for Further Education, at present (January 1, 2021), there are only 250 students registered for the online University of the Third Age project. One of the positive aspects is that this institution has also opened classes in the Department of Computers and Informatization of Society, which has been at the University of the Third Age almost since the beginning of its operation. As a reflection on the needs of seniors and society, seniors have been educated in the field of computer literacy for several years in courses such as Digital Photography, Social Media and the Internet, and Smartphones. The University of the Third Age of the Comenius University also has many projects aimed mainly at improving the computer competencies of seniors.

Another part of older adults, more passive seniors who are not used to ICT, do not have developed digital skills to work with ICT. We think it is important to pay attention to these people, who may be socially isolated during the pandemic and that can have a very negative effect on the mental and physical health of these people. At the same time, the use of ICT can help to improve the subjective well-being of older people, as these technologies support social engagement and reduce loneliness. At the same time, working with ICT contributes to the development of motor, perceptual, cognitive, and affective skills of seniors. Of course, the motivation of the person who teaches the senior these skills is very important, as well as the self-confidence of the seniors. In discourse, they may encounter the stereotype that "they are too old and will not learn anything new". At the same time, people could point out the deteriorating health of seniors in the sense that their vision is deteriorating and therefore they do not know how to use ICT. However, the digital skill also lies in the fact that seniors can zoom in on a text, enlarge it, and thus see it better. Information and communication technologies offer several support functions for people suffering from health problems that prevent them from using ICT in the same way as healthy people. However, the development of digital competence is also dependent on the fact that these people learn to use these assistive technologies. During the pandemic, seniors could obtain information from the Internet while keeping in touch with their loved ones, friends, and acquaintances, reducing their feelings of loneliness and isolation during the "covid period", when visits to hospitals, assisted living facilities, and nursing homes, and when responsible people are trying to limit personal contact with the oldest people in order to protect them from the coronavirus. It is therefore important to develop the digital and information competence of seniors, to improve their critical thinking so that they can safely navigate the virtual space.

As the current situation has shown, seniors also need to communicate to some extent through ICT, not only to stay in social contact with family and acquaintances but above all to have information on the provision of health care. In this regard, we can also express a slight criticism of the interactive behavior of interested individuals, who are not aware that not everyone (a senior) has access to the Internet (or does not have sufficiently developed computer skills) and thus naturally prefers personal contact (or is literally dependent on it). Therefore, we see the need to draw attention to the need to cultivate interactive behavior in common everyday situations – such as the "visit" to the doctor. While a younger person (or even a more active person over the age of 65) more easily adapts to the situation and communication via the Internet is natural to them, for a more passive senior this transition to digitised contact can cause social exclusion. The results of our research showed that more passive seniors obtain information through their acquaintances or from the staff in the facility where they live. It turns out that not every senior is used to obtaining information from the Internet.

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ACADEMIC FAILURE IN CZECH HIGHER EDUCATION AND SOME KEY RESEARCH ASPECTS

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Abstract: *This contribution is focused on the methodological background of the research problem of academic failure in higher education. It discuss societal developments in this area and outlines the importance and influence of education on one's life trajectory. The authors clarify the framework of methodology design and interpreting such a research strategy, mention the circumstances that must be adapted and altered during process of implementing such a survey, and critically introduce them into the discourse of social reality. The main aim of the article is highlighting the key aspects of the research in pedagogy, that should be reflected.*

Keywords: *research project, academic failure, college, education, student*

1. Introduction to the question of higher education study

According to data published by the Czech Statistical Bureau, the Czech Republic has more than 10.6 million inhabitants. Of that number, a total of 1.3 million have completed higher education. The number of college-educated persons living in the Czech Republic, as statistical surveys declare, has increased enormously, by almost 750 000 people and the annual statistics of the Education Ministry report that this represents a growth of almost 134 % compared to 20 years ago. The number of college students in the population has increased. At that same time, during that 20-year period the number of persons who have graduated from the kind of secondary school that does not offer a school-leaving examination has declined by 125 000. As of today, the ministry reports there are 2.2 million such students. It also has to be said that the number of persons successfully passing the secondary school-leaving examination has grown to 505 000 inhabitants. Overall, therefore, 2.1 million people have successfully passed a school-leaving examination. According to ISCED and the Czech education system, college education is the third (or tertiary) level of education provided by academic institutions. It therefore represents the highest degree after which no further study formally exists. Higher education is dealt with at the executive branch level by the Education Ministry in the Czech Republic. The ministry itself, however, is not the institution that awards accreditation, which is the agreement that an institution may implement ISCED 6 through ISCED 8 level education in a particular study program. On the territory of the Czech Republic, the following are the total numbers of institutions accredited: 27 publicly funded colleges, 2 state-administered colleges, namely, the Police Academy of the Czech Republic in Prague and the University of Defense, 37 private colleges, 16 international colleges, or rather, campuses of colleges headquartered abroad that are located on Czech territory.

In comparison to other European countries, the Czech Republic continues to be one of the countries that expends the smallest proportion of its financial capacities on education, its structures and its systems. Annually the Czech Government declares it has released a rather high allocation of financial flows for this purpose, but in many cases, as several published studies demonstrate, the money is not made adequate use of, or if it is used, then only partially, so the actual flow and transfer of such funding is a matter of discussion. Financing for education is expended and spent, and there is quite a lot of it.

The issue of preventing academic failure in higher education, which we have been researching in recent years, is not sufficiently discussed in the Czech Republic. Neither in the tertiary education system nor in the variously established research-oriented or academic platforms has this subject received much attention. The regularly performed collection of educational data points that are processed through the relevant statistical indicators, including the ongoing monitoring of demographic data and its subsequent presentation, cannot sufficiently meet the definition of the epistemologically required knowledge about the essence of the problem as a whole. The paradigm of sociological research, in which answers are found to questions about the existence, extent and development of societal phenomena, requires that processes define exact standards for the implementation of extensive empirical objectives that can apply across the board. The findings of partial surveys are just able to serve as a framework orientation. They cannot be considered holistic knowledge of the problem exactly because they lack the above-mentioned standards.

2. The interdisciplinary background to researching academic failure in higher education

Theoretical concepts point to the importance of success during one's educational career, to its impact at the level of the individual and generally in society. Social psychology emphasizes the role played by this phenomenon in social relationships. That discipline points to the lifelong determinism of academic achievement, not just at the level of interpersonal interactions, but also intra-personally. The science of pedagogy comments on the factors that impact the educational trajectory, clarifying their importance, and by means of its approaches and

strategies, that discipline attempts to harmonize educational processes, mechanisms and the application of instruments thanks to which it is possible to achieve intentional educational aims. We know very little about academic failure and its causality in higher education. The research that has been implemented (Fischer, J., Vltavská, K. et al, 2016; MŠMT – Ministry of Education, Youth and Sport 2016) contributes statistical values that we know how to categorize according to the relevant parameters, but we do not know how to contextually clarify their meaning, to grasp the problem in its entirety. Not just educationally oriented research, but also general social science surveys demonstrate deficiencies in this area. Be that as it may, sociological perspectives and the available regularly updated sociodemographic indicators have indicated certain challenges in this area for many years:

- Many students terminating their bachelor's degree studies do so relatively quickly after enrolling.
- For many students it is difficult to obtain a valid declaration that they did actually begin their studies. This is not followed statistically.
- Two-thirds of those who initially do not complete their bachelor's level studies do return to them.
- The lowest rate of academic failure in relation to completing the relevant level of higher education is recorded for Masters' programs. On the other hand, the highest degree of academic failure, in terms of numbers of students, has long been reported for doctoral programs.
- It is being demonstrated that the influence of the type of secondary education acquired plays a certain role in the successful completion of higher education. Statistical indicators tell us that 64% of the graduates from secondary technical schools terminate their higher education ahead of time more frequently than graduates of college preparatory education (*gymnázium* - 53.1%).

The reasons for the growing indicators of academic failure among those attending tertiary education are very close to the reasons the authors Pikálková, S., Vojtěch, J. Kleňha, D. (2014) mention in association with applying for college. Those authors mention determinism and influences associated with the following:

- Interest in a field and associated ideas about a future profession in the field
- Opportunities to apply oneself on the labor market connected with the study program
- Salary levels in the profession
- An attempt to acquire a college degree irrespective of the program of study
- Association of a college degree with a future labor market position.

The authors also state that these factors play a significant role in motivating study in the program chosen and successfully completing it or any other course of study. Such facts influence:

- the successful completion rate of college study
- the degree to which students change their chosen field during college
- the overall length of study prior to graduating successfully
- transferring from one level of study to the next or from one form of study to another.

Any enumeration of the differently conceived parameters, indicators, indices and standards of measurement that could be generated by the subject of our research would actually be quite extensive. The prospect of the possible, or the existing, or any absolutely newly established classifications arising for different purposes from a statistical standpoint would be equally extensive. Any scientific basis for the fields of the relevant disciplines in relationship to these variables then establishes its own systematization of epistemology as a matter of principle. We have added requirements reflecting an interdisciplinary approach to such knowledge to the framework of the research intention as we conceived it. A significant pillar of the discussions mentioned involved education as it is actually performed, conceived of as a complementary component. *Social pedagogy* aided us with perceiving a broader dimension of the phenomenon at issue. We focused on the contexts associated with one's social environment, where one's socialization processes happen and in which relationships are created and built upon, and where one finds opportunities to apply oneself for self-realization. We did not forget about the current trends reflecting questions of social inclusion in society, or about critical moments that impact or co-contribute to the creation of social barriers, or that support stigmatization, marginalization, segregation and similar socially undesirable approaches. We also approached the entire problem from the perspective of *special needs pedagogy*. However, this was not in a predominantly interventionist sense. Our approach took into consideration the preventive perspective guaranteeing equal conditions and fair access to a quality education for all in accordance with the principles of "The Salamanca Statement and Framework for Action on Special Needs Education" (UNESCO 1994) and the theses presented in the document called "The Dakar Framework for Action" (UNESCO 2000). Understandably, we included other documents and resources that were chronologically and developmentally - or rather, content-wise – materially related to these UNESCO declarations, the validity of which remains current. The *psychological* background to the researched phenomenon especially involved confronting crucial contexts with respect to the human personality and its dynamics among those involved in higher education.

3. The research project about academic failure and methodologies for investigating it

We included the steps and approaches described below in the research as a whole, thanks to which at this point we can clarify for the reader not just the research problem that was addressed in the project plan, but also the different causalities that accumulated during our implementation of

the research. Some required adapting certain guidelines of a material and procedural nature, requiring a different approach to addressing an issue compared to our original plan. Others managed to be unraveled more quickly in terms of time than we had anticipated, or due to the existence of newly arising circumstances, a method for addressing them proved easier and simpler to materially or procedurally grasp due to changes that were proposed and then taken advantage of. All of these and similar situations that arose and that we had to contend with will be mentioned absolutely openly in the relevant passages of our communication. Indeed, some of the deficiencies that this research and the presentation of its findings demonstrate actually did occur. We admit this openly and it is legitimate to acknowledge it. The degree of our subjective positioning, our overall perception of the phenomenon being researched and of its extent could all have been determined by different circumstances. We admit that we may not have adequately processed all of these aspects in cognitive terms. Likewise, we also can critically and objectively state that certainly not all of us, during our cognition, may have either processed or recorded those limitations, whether of a temporary or constant nature. Other attributes related to an epistemological reflection on the nature and extent of the examined phenomenon include the assumptions of that reflection itself and its qualities, which form a kind of notional input into the object of the investigation itself. This usually generates some guarantee of the expected result towards which the actual implementation and any of the steps, procedures and decisions taken will point, in the broadest sense. Implementation is also related to aspiration, the level of that aspiration, the actual prerequisites for achieving the given objective and other causalities. In the discourses of epistemology, the knowledge should include all the stakeholders involved, whether from the positions of guarantors, implementers, or aspirants. The stakeholder should also be included in whom cognition of aspirations vis-à-vis others, or vis-à-vis the anticipated findings of the investigation, creates the arrangement of the requirement to include all potential factors in the above-mentioned reflection on the knowledge acquired. The individual and group interviews with academic and non-academic staff holding various positions not just within the monitored university, but also outside it, took place in different formats and in different format conditions. Their length was always different, as were their dynamics. Informant-academics were working, at the time of the research, in the positions of assistants, lecturers, associate professors and professors. Some of them had chronologically, sequentially held all of these positions during their professional career in academic activity. The smallest cohort were academics in the position of assistants. The non-academic staff mainly included department officials. In controlled interviews with the informants, some ambivalent areas appeared in their attitudes. Their attitude patterns and opinions varied depending on whether the content of their communication was based on representations they were making as representatives of an academic discipline, or on whether they were speaking as officials (e.g., as head of the Science and Education Department, vice-deans, deans, Vice-Rectors, Rectors, etc.). A simple reason led us to target academics working even outside the university concerned: our primary motivation was to gain perspectives of knowledge from a broader horizon. The subsequent effort involved getting to know those perspectives, to see and hear them, and therefore to enrich our knowledge, whether those perspectives would be relatively tangibly more extensive, new, or even considerably poorer (but still rewarding for the knowledge in and of itself). We then entered the data obtained from the interviews conducted, from the intentionally set cases of observation, or from cases where observation operationally occurred and where the essence of these realities had a certain informational value for the object of our interest. Use of such data for research like this yields not just empirical material - which becomes a part of the whole corpus and is subject to complex processing, or serves to address a phenomenon in a methodical, modular form - but can also include proposals, challenges and either explicitly or implicitly voiced risks to the research methodology. We thus exercised all of the above-mentioned possibilities by including empirical material created outside the project for a time-limited period in the research data, which we strictly associated with data of a statistical nature. We consider it relevant to the understanding of the social reality of the phenomenon as a whole. Interpretation of its content is interconnected with the researchers and informants who formed the two main pillars of the research topic. The third pillar is, in our opinion, empirical material that is to be interpreted as knowledge. Time was not the only criterion with which our research perception had to deal. Analytical-synthetic, comparative, critical-discursive and other hermeneutically set approaches allowed us to define additional criteria. These included the affiliations of the researcher and informant with the monitored institution (in the dyad of employed – not employed) and the roles or positions held by the researcher and informant (in variable combinations: employee and student, associate professor and vice-dean, etc.). Different professional academic experience and its duration, any professional, academic or other experience with the institution concerned and with other, similar institutions were other criteria.

In our research activities we stressed the content differentiation of the individual empirical materials for the application of procedural and processual approaches, as well as the choice of the optimal means, methods and techniques of data processing, including critically evaluated, prudent interpretations, or rather, reinterpretation. We did so within the existing limitations of which we were aware on at least two levels, where, while the subject of the research may have become analyzing the indicators determining the failure of students in tertiary education at one Czech university, of course, as the available resources and the published domestic and international studies have demonstrated, and as is confirmed by pedagogical science theory, the university as

a school, as an institution of education and cultivation is, by the logic of this matter, itself one of the key indicators. In this conception it is being perceived as a whole, but what determines it as a whole are the actions realized by the sub-entities of which it is formed. Those sub-entities make people into either objects or subjects of this research. The academic disciplines, phenomena, situations, processes and other forms of these entities also create their positionality.

The research team solving this problem is, therefore, notionally sitting on two chairs at once. Among its ranks are representatives of both the academic community and the non-academic community at the university – those who work and perform their profession at the university, and those who have ended up there because they are studying. We also remembered to conduct interviews with those whom academic success immediately concerns, with students at all levels of higher education. Given the limiting capacities in terms of time and personnel, however, we did not access representatives of students from every study program, or rather from every department, being realized through the university that is just discussed here. However, we are not saying that in the context related to the phenomenon being addressed by us we did not involve ourselves with the intentions of each component of university. The group discussion platforms that were implemented were thematically associated and, from the perspective of the time scale, had existed for various lengths of time as academic, staff management, staff coordination, staff counseling, and staff training team platforms; they may not have been given names that copied the project plan, but nevertheless their essence touched on the themes being addressed – sometimes to a greater extent, sometimes to a lesser extent, we admit. The methodological design at the procedural level, at the level of methods and techniques, was also created by the same personnel as those undertaking the implementation of the project. The implementation team itself, as we have already indicated, therefore become another source for accumulating empirical materials and background information, the content of which belonged thematically to what was being addressed and, in our judgment, contributed what it is anticipated that a qualitatively established aim will deliver. For the exact, unambiguous perception of the qualitatively oriented character of the research, we would add that the investigation as implemented includes signs of active participant research, which is sometimes labeled community-based research.

4. Conclusion

Implementing research focused on the question of academic failure is not as easy as it might seem. The statistical collection of empirical data and its interpretation may revel values, numbers, and the weight of certain indicators. However, these include many unclarified questions and confrontations and, in some cases either explicitly or implicitly communicate that they contradict what a research interpretation of a quantitative type would include. The research problem vis-à-vis this phenomenon is of a multilayered nature and therefore requires an interdisciplinary perspective in the approaches taken and the processes of knowledge creation. Education undoubtedly influences the life course not just of an individual, for whom the context of academic failure is apparent, but also impacts the quality of life of that person's loved ones. The methodological framework of the epistemology of the problem being addressed therefore outlines an entire constellation of research subjects with which higher education pedagogy could or should become involved. Another example of such interdisciplinary interconnections is, for example, the subject of temporarily interrupting higher education study and the causalities and reasons for it (see Lopes, M. C. M., Fernandes, G. L. 2011).

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ARTS & TECH INTEGRATION: DIGITAL DRAWING AND PAINTING PROCESS

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Abstract: *The paper points out an important educational aspect of M-learning in Art education, specifically focusing on digital drawing and painting. The current concept of Art education in basic education is based on the pupil creating, perceiving and interpreting works. During Art education, specifically at the primary school, pupils should be given space to learn about various art forms which they should perceive intensively and should be able to reflect on their experience of creation. Art should be interdisciplinary and interactive. We understand the connection between visual literacy and digital literacy as an interdisciplinary approach, and we can see interactivity in the method of education through M-learning. The paper presents applications designed for digital drawing and painting which could be beneficial in teaching Art education and could stimulate pupils to develop their own artistic skills in the field of digital creation. The author sees digital creation as an opportunity for some pupils to overcome the uncertainties, difficulties and fears of failing the art task; digital creation is also a creative process, the result of which can support the success and confidence of pupils in Art education.*

Keywords: *Education, pupils, M-learning, art process, digital art.*

1. Introduction

Art education in primary school has a strong potential, which is used to a limited extent. Knowledge from practice still shows that art teachers do not use modern digital technologies in their work, i.e. underutilisation of the possibilities of mobile applications and new media in the art process. The development of visual literacy and digital literacy is often neglected in Art education, which can affect children's interest in art, digital art and overall creativity. The use of modern technology and M-learning could be a great motivating stimulus for pupils who experience problems with the creative process in Art education. M-learning would be a tool for many children to break down the barrier of fear of artistic creativity and overcome the fear of artistic expression – pupils should be given space for joyful discovery of unconventional creative tools to express their idea, vision and opinion.

1.1 Contemporary Conception of Art Education

Often art teachers hear sentences from their pupils: "I can't draw", "I can't do it" or "I don't enjoy it". If art teachers focused on digital creativity and used M-learning, they might not hear such sentences from their pupils.

Furthermore, practice and knowledge from research prove to us that teachers still underestimate Art and Culture, or the content of lessons is still contrary to the apprenticeship given by the Framework Educational Programme for Basic Education of the Czech Republic. For example, the results from doc. P. Sobanova's research from 2016 show that for some teachers, Art education is a very problematic area and the poor performance of pupil is due to the unprofessionality of teachers, as Art education is largely teachered by an unproductive teacher [1]. It should be added that the Czech Framework Educational Programme for Basic Education for the Arts and Culture educational area is based on creative activities: 1. Creation; 2. Perception and 3. Interpretation. These three spheres in children develop their own perceptuality, feeling, thinking, experience, intuition, invention and imagination. The focus of this educational area is on:

- Understanding art as a specific cognition;
- understanding of art and culture;
- creating a stimulating atmosphere for creation, learning about artistic values in a social and cultural context;
- tolerance for the diverse cultural values of the present and the past;
- self-awareness;
- overcoming stereotypes and enriching emotional life and understanding the process of creation [2].

At the same time, we are still observing poor quality art education which is manifested, for example, by the fact that the teacher does not have knowledge in the field of art or fine techniques, and in art lessons there is a small presentation of reproductions of artifacts, i.e. reproductions from online databases of museum collections.

Art education is a great opportunity to get to know the world around us. The pupil should not only develop in one artistic area, but should learn about varied art themes and diverse artistic techniques that pupil could also connect with new media.

1.2 M-learning and Art Teacher

An important aspect of Art education is the provision of stimuli from the art world and culture and to show children our cultural heritage and culture of all mankind. The pupil is supposed to understand cultural history and his position in society, while at the same time appreciateing forms of creativity. Through creativity and experimentation with various artistic media, the pupil finds his own identity and reflects on himself, because in his artistic work he reflects his opinions, feelings, impressions and attitudes.
The art teacher should develop in his art lesson:

- Innovation;
- creative atmosphere;
- adequate motivation of their pupils for dialogue and creation;
- creative experience and experimentation;
- children's examination of technological processes, etc.;
- ability to perceive the art theme;
- motivation of pupils to find their own artistic authenticity;
- children's knowledge of artefacts;
- a space for 'sharing and communicating' pupil artefacts;
- children's self-criticism and self-discipline.

Contemporary Art education is based on visual literacy and critical thinking integrating contemporary art. The current content of artistic education should be implemented in the process of contextual and constructive learning. The goal of this process is the development of conceptual understanding, personal spiritual growth, creativity, the ability to interpret and the ability to control information through ITC [3].

M-learning in the artistic field offers a wide range of creative possibilities, e.g . image media offer varied creative possibilities based on search and experimentation, where the pupils are encouraged to awaken their courage to creativity and motivated to apply their own personal feelings and experiences.

The interaction of M-learning with the content of the Arts and Culture for basic educational area can really affect the quality of art education and this can serve to improve the pupil's life for the purpose of his personal self-realization, personal growth and lifelong learning.

2. M-learning for Art education

This chapter focuses on the use of M-learning which is available for installation and which would be suitable for artistic education.

The creation of mobile applications focused on creativity is very dynamic in the sector which also attracts creative developers. The smartphone market, as well as the development of iPads and tablets, and mobile applications are constantly booming. We can see in the offer of distribution platforms AppStore and Google Play, which offer many new software items.

Subsequently, we focus on the software offered which we have divided into software for digital drawing and painting (Tab. 1).

As part of the analysis, 15 creative applications were selected that would be adequate for Art education.

2.1 Digital drawing and painting

Digital art is multifaceted and surprising. The digital process is a product of our time and is a medium offering artists numerous innovative forms. Digital art is offered to those artists who want to walk entirely new artistic paths [4].

As part of the digital creative process, the pupil can develop his authentic and original artistic expression. Thanks to the applications offered, the pupil is allowed to discover variations of drawing lines, i.e. drawing lines. Pupil can play with the drawing track and experiment with drawing structures of different drawing tools. At the same time, digital drawing allows pupil to hatch and visually capture the volume of the thing or perspective. Similarly, digital painting allows pupils to create diverse colour combinations, mix colours and observe the expressive characteristics of colour combinations, and can simply change painting tools during the painting process. The pupil is familiar with expressive artistic instruments that develop his ways of art thinking. Artistic thinking through the digital art process easily adapts to the qualities of the digital means offered, i.e. painting, graphic, drawing and photographic and plastic (3D creation of objects).

During digital creation, the pupil develops his personality and psychological components, i.e.:

- Develop fantasies, imaginations;
- inutics and inventions;
- development of self-awareness of its relationship to the artistic intention and its content.

The pupil is aware of his own reactions during the artistic process, these reactions motivate him to further creative permeation, as he finds the effectiveness of his own procedures and results. At the same time, the pupil intensively concentrates on his own work which induces emotional ties and experience in him. Based on this innovative approach to the digital creative process, the pupil senses the artistic experience that is formed throughout the artistic expression.

Digital drawing and painting can create new discoveries in children, amazement at the resulting art works and a sense of adventure.

2.2 Applications for the digital creative process

PaperColor

Benefits of using App in Art education: App for beginners and to get acquainted with digital drawing and painting. We would recommend an application called PaperColor which also allows smudge and creation of graffiti.
Another advantage: App is an easy painting application which is imitating the paintbrush to draw and doodle. Easy to paint and learning to draw.

Pocket Paint

Benefits of using App in Art education: The experimental combination of drawing or painting with photography is possible with Pocket paint. This application allows users to store their creation in png. format. We can use the application for artistic beginners.

Another advantage: The App is a simple drawing editor that allows users to set part of the images to transparency and increase the pixel level.

ArtFlow: Paint Draw Sketchbook
Benefits of using App in Art education: Another easy application which provides a digital sketchbook with more than 80 paint brushes.
Another advantage: This fast application is based on the development of intuitive painting and drawing. The app is also suitable for tablets using a digital pen.

Huion Sketch
Benefits of using App in Art education: We can see the possibility of quality sketching and creating illustrations using a digital pen.
Another advantage: 41 kinds of common and delicate brushes qualified for most of art work; Important painting tools (Stabilizer smooths and perfects strokes in real; Insert shape like line; Rectangle and oval; Canvas Flip horizontally and vertically, Symmetry visual guides; Import picture to edit or cope an artwork); Multi-touch gestures features.

SketchBook
Benefits of using App in Art education: Quality sketching can also be done in the SketchBook app. In this application, the pupil can start by sketching and move his drawing to the original work of art. This application allows drawing using a circle and ruler.
Another advantage: Perspective Guides, with 1, 2, and 3 point perspective guides, a snapping toggle, vanishing point lock, and horizon line visibility. Customize, Infinite, and Constrained Grid tools. Curve ruler, for drawing curves you can't get with the Ellipse tool. (Support for the new Apple Pencil 2nd generation, which includes its double-tap functionality. Support for Scan Sketch for the new iPad).

3D Modeling APP: Sketch, Design, Draw & Sculpt
Benefits of using App in Art education: An interesting application can be considered a 3D Modeling APP in which the user can draw and create moving 3D objects on a mobile or tablet and there is no need for a digital pen.
Another advantage: Grid with settable size and snapping value; Distance between vertices; Edge length; Wireframe and shaded on/off; Shadows on/off; Axis on/off; Vertex color painting; 20 materials can be applied to objects; Set move, rotate and scale precise values; Convert selection; Move vertices, edges, faces nad objects freely without grid snap; Auto-save.

Pics Art Color
Benefits of using App in Art education: App offers a varied brush library and blending modes, app is suitable for artistic representation of a self-portrait using a playful Selfie. The advantage of this application is the safety and protection of own creations, or the protection of the process of artwork, the art process does not disappear and is not prematurely terminated.
Another advantage: Texture brush (drawing not only with color but with texture); Pressure sensitivity (make full use of your apple pencil for maximum effect); Auto-recovery; Blending modes (use different blending modes to achieve some truly artistic results); An entire library of customizable brushes. Text tool that allows users to draw and erase using text. App is available for free and with no ads.

Ibis Paint X
Benefits of using App in Art education: The versatile art application is Ibis Paint X, which includes more than 100 million art series, 2500 art materials, 800 font options, 381 brush types, 71 filters and 27 colors for mixing.
Another advantage: Many tutorial videos on ibis Paint are uploaded to Youtube channel; Ibis Paint has high functionality as a drawing app along with features of sharing drawing processes with other users.

Infinite Painter
Benefits of using App in Art education: One of the best-designed, award-winning creative applications, also with rich and powerful art sets. An interesting thing about this application is the creation of 3D urban landscapes with different perspective guides.
Another advantage: Smart shape detection by pausing when drawing; Innovative Hatching guide; Minimal and intuitive interface; Easily group layers; Sharing Time-lapse recordings with social networks; Convert any stroke into an editable shape; Hundreds of built-in brushes (Airbrushes, Calligraphy, Chalk, Charcoal, Glow, Lasso Fills, Pencils, Markers, Oil Paint, Paint Splatter, Spray Paint, Screentones, and Watercolor); Realistic brush to canvas interaction; Over 100 customizable settings for every brush; Organizing and sharing favorite brushes and brush sets; Designed for the Apple Pencil with full pressure and tilt support; Sample lower layers when blending; Import and export custom brushes and sets.

Draw Desk: Draw & Paint Art
Benefits of using App in Art education: This application offers realistic drawing and "reanimation" of artistic creations, at the same time it is suitable even for the smallest artists, since it also offers the "Doodle desk" function for expressive drawing.
Another advantage: App is the most requested creative application used by over 30 million users worldwide.

AdobePhotoshop: Sketch
Benefits of using App in Art education: AdobePhotoshop: Sketch also offers a circle, ruler, and other templates that provides the ability to draw on a selected photo and pupil can use perspective and graphics grids for accuracy.
Another advantage: 24 built-in brushes with adjustable size, color, opacity and blending settings; Tap into thousands of Photoshop brushes by importing them into Sketch; Mix photos with drawing layers.

Adobe Fresco: Draw & Paint

Benefits of using App in Art education: Adobe Fresco is recommended for more skilled and advanced artists, designed for users who want to perfect their artwork. The option for this application is that it can connect with Adobe Photoshop Sketch and Adobe Illustrator Draw.

Another advantage: App reimagines essential tools for illustrators, including modernized selection and masking, and a flexible so pupil can draw faster and without distractions.

Adobe Illustrator Draw

Benefits of using App in Art education: With Adobe Illustrator Draw, a user can design logos, icons, illustrations, and toolkits that include gradients, shape creation, and precise vector editing tools.

Another advantage: Creating logos, icons, illustrations, and graphics with a design toolkit that includes type, gradients, shape-building, and precise vector editing tools.

Concepts

Benefits of using App in Art education: Concepts is considered a very successful application. App provides flexible space for thinking, planning, and artwork. The pupil can sketch his plans on an "infinite" canvas, which can enrich notes, spontaneous dooding, and can also create drawn scenarios, product sketches that he can share with friends or other applications.

Another advantage: Editable vector-based sketching (move, organize, edit by tool, color, size, scale, smoothing, opacity).

MediBang Paint

Benefits of using App in Art education: App to create comics. This app contains everything to create comics or illustrations. MediBang Paint also comes with cloud storage, so work can be backed up.

Another advantage: Comic Fonts (using them to change the atmosphere of your comics; using them to define your character's moods or personalities); Comic Creation (Just drag across the screen to create comic panels; Freely transform shape).

The digital creation applications offered include playfulness and exploration that unequivocally develop creativity, imagination and digital skills. The pupils can compare different drawing lines and structures of various drawing tools, also can accurately draw or design their own typography or logos.

In digital painting, the pupils can overlap color painting areas, mix colors and use a rich color palette. The pupils can choose whether to combine their painting with spray or the work will be processed by watercolor, etc. some applications also allow users to select canvas or watercolor papers.

Table 1 Applications for digital drawing and painting

Applications	*Skills*	*Appropriate Platforms*
Infinite Painter ©2012 Infinite Studio Ltc.	Drawing; painting	iPhone; iPad; Smartphone; Tablet
Adobe Photoshop Sketch ©Adobe Inc. 2020	Drawing; painting	iPhone; iPad; Smartphone; Tablet
Sketch Book – draw and paint ©Autodesk Inc.	Drawing; painting	iPhone; iPad; Smartphone; Tablet
Draw Desk: Draw & Paint Art ©Art Solution	Drawing; painting	iPhone; iPad; Apple Watch;
Adobe Fresco ©2016-2021 Adobe.	Drawing; painting	iPhone; iPad
PaperColor ©Colorfit	Drawing; painting	Smartphone; Tablet
Adobe Illustrator Draw ©2020 Adobe Inc.	Drawing	iPhone; iPad; Smartphone; Tablet
Concepts ©TopHatch, Inc.	Drawing	iPhone; iPad; Smartphone; Tablet
Medibang Paint ©2015 MediBang Inc	Drawing; painting	iPhone; Smartphone; Tablet
Pocket Paint ©Catrobat	Drawing; (photo)	iPhone; Smartphone
ArtFlow: Paint Draw Sketchbook ©Artflow Studio	Drawing; painting	Smartphone; Tablet
Ibis Paint X ©Ibis Inc, 2020	Drawing; painting	iPhone; iPad; Tablet, Smartphone
PicsArt Color ©PicsArt, Inc.	Drawing; painting	iPhone; iPad; Tablet, Smartphone
Huion Sketch – Paint & Creative ©Huion	Drawing; painting	Tablet, Smartphone
3D Modeling App – Sketch, Design, Draw & Sculpt ©3D Modeling Apps	Drawing	Tablet, Smartphone

3. Conclusions

In the first part, the paper highlighted the possible functions of M-learning in the way of online Art education. Part of the paper was to outline contemporary Art education in the Czech Republic and the possibilities of using M-learning during the development of artistic thinking and the artistic process. The second part of the paper dealt with the offer of creative applications that would be suitable for Art education in primary school. The fundamental task of the art teacher is to support the creative interests of pupils in a versatile way. The pupil should learn to manipulate both classical visual media and modern (digital) media. Modern technology is to be used in Art education because we are in a digital age in which pupils must learn to effectively control these digital media. The art teacher, together with the pupils, has a sense of modern technologies in Art education. At the same time, digital technologies bring pupils new creative possibilities based on the creation of digitally altered images based on their own experiences, intuition and experiences. Through creative software and offered functions, the pupils learns to think creatively and critically, also needs to focus and

think about experimental discovery and the search for their own distinctive creative expression. Furthermore, digital creation can be edited and developed in another creative application, so that the final result of the digital artifact can be altered several times. Of course, classical and traditional drawing and painting techniques cannot be replaced, but an innovative way and a new dimension of creativity can just represent digital creativity that can be associated with classical drawing or painting.

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M-LEARNING: ARTS EDUCATION IN THE DIGITAL AGE

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Abstract: *The paper points out an important educational aspect of M-learning in Art education, specifically focusing on art history and museum collections. In the first part, the paper deals with M-learning and looks at this method of education as an option that would fundamentally affect the quality of art education. Above all, the author considers how the use of M-learning in art education could stimulate the development of children's knowledge, critical thinking, as well as how it could arouse children's curiosity and deepen their interest in their (self)education in the field of art. The paper also points out the possible disadvantages of M-learning for art education. The second part of the paper presents applications designed for learning and understanding art and art collections, which could be beneficial in teaching art education and could stimulate pupils to develop their own knowledge of art.*

Keywords: *Art education, pupils, M-learning, art history, museum collections.*

1. Introduction

The origin of the letter "M" in the word M-learning means "mobile". At present, this form of education is one of the topics much discussed, as it is a type that is based on active self-study and individual study work, even without the use of a desktop computer [1].

M-learning is often associated with the trend of using shorter lessons (so-called Microlearning) through app devices on mobile phones or tablets. Many M-learning publications report that the contribution of M-learning is to support the education of pupils in their studies so-called "on the move". M-learning is an education that is not fixed to a specific place and uses available mobile technologies and end devices [2].

The paper reflects on the use of the M-learning method in art education at primary school. Furthermore, the text describes suitable applications that could be used during art education. The first part of the text focuses on suitable M-learning which could be used to support and develop artistic creativity, imagination and creative thinking. The second part of the text focuses on M-learning which would be beneficial in the development of children's knowledge about art and artistic creativity.

1.1 Arts and Culture in the Czech Framework Education Programme for Basic Education

Art education in primary school is included in the educational area Arts and Culture. This educational area is intended to provide pupils with space for rational knowledge of the world and an understanding of culture as a process and the result of spiritual activity. Within the educational area Arts and Culture, the pupil is to be familiar with historical and social changes.

The pupil should understand art as a process of specific knowledge and understanding, in which information about the external and inner world is created. Education in this area brings artistic understanding of the world, i.e. learning with aesthetic effect.

In the process of artistic understanding of the world, the specific feeling, susceptibility of the individual to the work of art and through it to himself and to the outside world is developed. Part of this process is to find and find links between types of art based on common themes, the ability to empathize with cultural needs [3].

1.2 (No)Cooperation of primary school with cultural institutions

An important part of Art education is continuous contact with the cultural environment outside the school, i.e. cooperation with various organizations and visits to corresponding events. According to a 3-year survey of the Czech School Inspectorate (CSI) focused on the educational area of Art and Culture at the primary school published in autumn 2020, important information arises, e.g. a quarter of schools do not cooperate with any cultural organizations or institutions (at the same time, it must be pointed out that museums and galleries provide schools with the necessary advice free of charge to compile artistic education that is not used by teachers. Some cultural institutions are willing to draw up an educational programme for the school); other results from the CSI pointed to the fact that some primary school pupils did not visit the art exhibition [4].

The big problem is that some schools do not visit art exhibitions, that is very the sad fact that many children will never visit any gallery or museum of fine art in their lifetime (pupils from socially disadvantaged backgrounds, etc.).

Another problem is the didactic conception of the visit, which is not addressed by even half of the art teachers, and a quarter omit the motivational training of pupils, as well as teachers neglecting the subsequent reflection in the form of a discussion. From a didactic point of view, there should never be a case where a teacher lets his pupils passively observe an artefact. Continuous communication with pupils about museum collections and artefacts is very important and it is necessary not only to inform pupils and

put them in the appropriate context, but also to give them sufficient space to express their own opinion and to discuss.

Older children should also be encouraged to seek out relevant information on the subject and to ask questions about what interests them. It is also advisable to use the museum exhibition or collection as inspiration for subsequent artwork of the pupils [5].

For these reasons, it would be appropriate for art teachers to work in their teaching with online visual arts and use M-learning to motivate pupils and develop their knowledge of the art. M-learning would be very helpful in the work of Art education teachers in the following areas:

- Presentation of the course in the context of art history.
- The pupil will get acquainted with the museum collections.
- Motivation of the pupil to art and culture.
- Awakening the pupil's interest in art and history.
- Searching for inspiration for artistic themes and tasks in databases of art collections or searching for inspirational stimuli in the so-called "guide to the art world".

2. Advantages and disadvantages of M-learning

Technological progress and the popularity of mobile devices have brought new ways of communication, as well as new possibilities for education and cooperation. Within the framework of Art education, we can understand how to instantly share and communicate an artifact with your community.

At present, education responds to the needs of pupils and teachers, while at the same time responding to constant evolving modern technologies that affect the whole education process. The Covid19 pandemic showed us the importance of digital literacy, and in a moment the traditional way of teaching has changed, i.e. the traditional concept of "teacher – whiteboard – pupil" has changed into a virtual class, in which new technologies and new ways of education began to play a major role.

From a didactic point of view, M-learning can be understood as multimedia support for the educational process, which is closely connected with modern communication and information technologies used to improve the quality of education. M-Learning can be divided according to several ways, among the most transparent and pedagogical understandable are the basic division into online and offline education. Mobile technology offers something new and is not explored in the field of Art education at a primary school (and primary art school) in the Czech Republic. Unfortunately, digital technologies in the Czech Republic have been constantly overlooked by public schools [6].

M-learning has become a new tool in the world to improve the educational process and is becoming an important part of pupil development, opening up opportunities to explore different ways of creative art and experimentation. M-learning allows easy access to the artistic process and allows the development of imagination, creative and virtual thinking. Furthermore, M-learning shows great potential in education, as it allows the pupil to create and learn visually anytime - anywhere. Of course, the use of M-learning and the overall use of mobile devices in Art education can have a negative attitude of teachers, because they can see different limitations in this way, or teachers will not understand the meanings and effectiveness of M-learning for the development of the pupil's creativity through digital artistic creation. Some M-learning art teachers may recognize it as an effective approach in art education, but they still do not achieve acceptable results in education, which can also be caused by several obstacles, e.g. low motivation of pupils; the teacher's low knowledge of digital media.

Advantages of M-learning for Art education:

1. M-learning can be used by pupils who, for some reason, are unable to attend art galeries or museums. 2. M-learning can be used by all pupils regardless of age, gender, health disadvantage and social disadvantage (including iPads or Tablets, which may be lent to pupils from socially disadvantaged enviroment for the purpose of their education). 3.M-learning gives opportunities for continuous education and without limitations. 4. M-learning provides flexibility. 5. M-learning develops motivation for your own further education and awakens curiosity. 6. M-learning provides new ways of creative learning and improves visual and digital literacy. 7. M-learning is an interactive and universal way to further develop children's knowledge.

Disadvantages of M-learning in Art education:

1. Problems with adequate usability, e.g. the size of the equipment capacity. 2. Low visual quality of information provided by mobile phone. 3. Lack of compatibility of mobile technology between pupil and teacher. 4. Insufficient coverage or failure of connections in wireless communication and low speed of information transmission. 5.There is a very high interest in digital technologies on the part of teachers. 6. Teachers see M-learning as a distraction, not an education, but they do not want to overcome traditional pedagogical ways and do not see in M-learning the potential of creative digital experimentation to enrich pupils [7].

3. Art-Online

In museum presentations and museum pedagogy, it is based on the pupil's visual perception of the external signs of the artifact, and thanks to sensory perception and accompanying explication, the content is better remembered into the pupil's consciousness. The benefits of digitizing collection funds and presenting them publicly on the Internet and in mobile applications are very useful, for example in ways to: 1. Broadening the concept of classical museums, wide availability. 2. The possibility of studying exhibits without the need to physically stay in the

exhibition. 3. The top quality of a number of digital representations of collections, which makes the study of collections much more detailed than conventional observations in the exhibition. 4. The interconnectedness of the data and the possibility of their coherence. 5. A new type of form of storage of digital data about collections (building memory banks not only for the sharing of information, but also in case of destruction, extinction, damage or destruction of the original object) [8].

During the 2016 research, the types of mobile applications of museums were identified: 1. Museum mobile presentation (The app contains simple information about the institution and collections). 2. Mobile guide to the museum /collections (The app contains information about the institution and its collection focus, as well as digital reproductions of collection items, a description of their location in the exhibition, a label). 3. Mobile collections database (The app is a mobile database of collection items that are presented thematically; the database can be completely simple, i.e. reproduction and label). 4. Educational applications (The essence of this type of application is to transform didactic content to promote understanding of content. An educational application can take the form of an interactive textbook or a game, etc.) [9].

3.1 Mobile application of museums and artefacts suitable for teaching Art education

This chapter focuses on the use of freely available museum-themed applications or the exploration of artefacts. Furthermore, we focused on mobile applications which are provided free of charge and can be used by the pupils even in the environment of their home. In this we focused on two mobile types of mobile application: Mobile Guide to Museum/Exposition (Tab.1); Educational applications in the context of art history (Tab. 2).

Suitable mobile applications such as museum guides/exhibitions for Art education at the 2nd grade primary school.

Table 1 Useful applications for Art education: Art collections Mobile Guide

Applications and Age rating	*Description*	*Appropriate Platforms*
Louvre Museum Visitor's Guide © Gonzalo Martin Age: 4+	Containing: Louvre History; Floor Plants; Sculptures; Egyptian Art; Greek, Etruscan and Roman Art; Islamic Antiquities; Paintings; Italian Paintings; English Paintings; French Paintings; Flemish Paintings.	iOS; Android
Louvre Abu Dhabi © 2017 Louvre Abu Dhabi Age: 4+	Stories of masterpieces and architecture; curator's tour of special exhibitions anytime and anywhere. The interactive map to find way around the galleries with geo-tracking.	iOS; Android
Orsay Museum visitor guide © Agustina Monti Age: 4+	Mobile guide 100% offline. Containing: Museum Introduction; History; Gare d'Orsay; Impressionism; Post-Impressionism; Major Masterpieces; Artists' Biographies; Major Sculptors; Practical Information; Access to a complete Guide of Paris, Louvre, Notre Dame Cathedral, Versailles.	iOS
Van Gogh Museum Visitors © Maria Age: 4+	History; Art Thefts; Vincent van Gogh Biography; Works from Nuenen (1880–1885); Works from Antwerp (1886); Works from Paris (1886–1888); Works from Arles (1888–1889); Works from Saint-Rémy (1889–1890); Works from Auvers-sur-Oise (1890).	iOS
British Museum guide © Vusiem Tour Guides Ltd. Age: 4+	Ancient Egypt; Ancient Assyria; Ancient Greece; Ancient India; Ancient China; Ancient Europe: Jade axe, The Gold cape, Ringlemere and Rialton gold cups Viking and Anglo Saxon artefacts, Lewis chessmen and Sutton Hoo helmet; Roman Britain; Persia.	iOS; Android
Guggenheim Museum Guide © eTips Inc. Age: 4+	The Museum of Non-objective Painting; The Guggenheim Museum; Design; Exterior Restoration; Later Years; Popular Culture.	iOS; Android
Pergamon Museum Berlin Full Edition © Vusiem Tour Guides Ltd. Age: 4+	The Ishtar gate, the Pergamon Altar and the beautiful streets of Babylon.	iOS; Android
Acropolis Museum Visitor Guide © eTips Inc. Age: 4+	History of the Museum; Parthenon Marbles; Old Acropolis Museum; Acropolis of Athens.	iOS
Art Basel © MCH Swiss Exhibition (Basel) Ltd. Age: 12+	Art Basel stages the world's premier fairs for Modern and contemporary art, held annually in Hong Kong, Basel, and Miami Beach. This is the official Art Basel app, featuring essential show information, news and updates from Art Basel, a catalog of artworks and galleries participating at the show, interactive floorplans, and events listings for every show.	iOS; Android
Hermitage Museum © The State Hermitage Museum Age: 4+	3 million items; the greatest works of art – paintings, sculptures, jewelry, ancient weapons, most exquisite exhibits of decorative and applied arts and unique archaeological finds. Virtual tours; educational courses; thematic excursions.	iOS
Uffizi Gallery Visitor Guide © eTips Inc. Age: 4+	Selection of Paintings: Santa Trinita Maesta, Rucellai Madonna, The Battle of San Romano, Coronation of the Virgin, Madonna and Child, Primavera, The Birth of Venus, among others; Ancient Sculptures such as the Arrontino and the Wrestlers.	iOS; Android
Kunsthistorisches Museum Visitor	House of Habsburg; Franz Joseph I of Austria; Picture gallery;	iOS

Guide © eTips Inc. Age: 4+	Hofburg; Others.	
MAK Museum Vien © MAK – Museum of Applied Arts Age: 12+	MAK Permanent Collections Vienna 1900; Asia Carpets and MAK DESIGN LAB.	iOS; Android
Moco Play © 2018 Moco Museum Age: 4+	New way of visiting the museum and make it a playful and fun experience for kids.	iOS; Android
Stedelijk Museum Visitor Guide © eTips Inc. Age: 4+	History; Architecture; 19th Century; 20th Century; 21st Century; Vandalism and Theft; Contemporary Collection; Weissman Building.	iOS
Rijksmuseum © 2018 Rijksmuseum Age: 4+	Many of the world's finest masterpieces: over 8,000 treasures across 80 exhibition rooms.	iOS; Android
ArtDatabase – The Art Guide © 2010-2013 Jordi Herms Age: 4+	More than 50.000 artworks. For each artistis: videos; curiosities; biographies; last news; artworks.	iOS
ArtLocal © 2014 MyCityMuse Inc. Age: 12+	Visually navigate the fine arts scene in any particular city. Preview artwork from nearby galleries and museums; visually inspired by the art and culture in each city.	iOS

Suitable mobile applications of the educational type for Art education at the 2nd stage of primary school.

Table 2 Useful applications for Art education: Educational applications in the context of Art history

Applications and Age rating	*Description*	*Appropriate Platforms*
DailyArt © 2021 Moiseum Age: 12+	Explore and search the collection of more than 2500 masterpieces. Read 700 artist biographies and information about 500 museum collections.	iOS
Smartify © 2020 SMARTIFY C.I.C. Age: 12+	Collection of more than 2 million; Audio tours at favourite collections and get art recommendations every day.	iOS
Art Legacy Live © 2016/2020 LANDKA ® Age: 12+	A collection in motion where the most notable paintings in the world reveal their depth and perspective. An immersive experience where Art becomes alive on screen. From Early Renaissance to Impressionism, Static artworks turn into animated masterpieces, a collection in motion with over 100 famous works of Art.	iOS
Art Masterpieces Quiz © FourFig Applications S.L. Age: 4+	This fun quiz consists on guessing the names of the artists that created the most famous art masterpieces. There are over 450 art masterpieces.	iOS
Google Arts & Culture © Google, Inc. Age: 12+	Google Arts & Culture puts the treasures, stories and knowledge of over 2,000 cultural institutions from 80 countries. Art Transfer; Art Selfie; Art Projector; Pocket Gallery; Art Camera; 360° videos – Experience culture in 360 degrees; Virtual reality tours.	iOS; Android
The Art Story © 2020 THE ART STORY FOUNDATION Age: 4+	The Art Story is guide to understanding and enjoying the best of the visual arts.	iOS; Android
Egyptian Museum Adventure 3D © Zhonglian2018 Age: 4+	New 3D Egyptian tomb escape, let users discover and adventure, all kinds of Egyptian elements.	iOS; Android
Papo Town: Museum © Papoworld Age: 4+	There are seven exhibition halls in Papo Town Museum, including the prehistoric creatures hall, stone age hall, ancient civilization, empire and knight, the Renaissance, the great exploration and industrial revolution exhibition hall. Kids will learn easily through games. There is a quiz after the introduction to test if kids have listened carefully and fully comprehended.	iOS; Android
Civilisation AR © BBC Age: 4+	The BBC's first ever Augmented Reality app 'Civilisations AR' brings art and culture direct to you from across the world.	iOS; Android
The Art Newspaper © The Art Newspaper Ltd. Age: 12+	The Art Newspaper is an online and print publication that covers the international art world. In addition to the news, The Art Newspaper publishes reviews and commentary by leading figures in the art world.	iOS

4. Conclusions

Paper was supposed to introduce the educational form of M-learning, its advantages and disadvantages. The text drew attention to the current state of Art education in the Czech Republic. In the next section, the types of mobile applications in the field of art history and presentation of museum collections. The last chapter highlights mobile applications that would be suitable for the work of an art teacher (and also for the learning of pupils themselves).

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SUMMATIVE ASSESSMENT AND COGNITIVE INTEREST AT FORMAL PHYSICS EDUCATION

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Abstract: *This paper deals with emotional aspects of knowledge diagnostics of students as well as evaluation of their performance. We investigate both, positive and negative effects of final assessment on students´ attitude towards physics as a school subject. This means we deal with the topic of motivation and interest in formal physics education and discuss the factors influencing them. Moreover, we want to find out what feelings dominate among primary-school students as it comes to physics. The aim of this paper is to determine mutual relations between final grades given to students at the end of the schoolyear and their interest level in physics study. A research method of a questionnaire has been used in order to categorize students according to their level of developed cognitive interest in physics. Several non-parametric statistical tests have been applied to confirm the relevance of the obtained research results.*

Keywords: *assessment, school-marks, interest, physics*

1. Introduction

In today´s society, prevailing opinions on physics are not very positive. For many years it has been the one of the least popular school subjects among students. They often say that physics curriculum is difficult and its topics are difficult to understand, therefore; they don't like to learn physics. The unpopularity of the subject is exacerbated not only by the nature and complexity of physical phenomena, but also by the high demands put on students mainly as it comes to theoretical methods of physics learning [1].

2. Assessment of students

Basic unit of teaching-learning process is a school lesson. It consists of four phases. First of them is called a motivational phase, followed by teacher´s exposition of new topic, then fixation of that topic and finally, the lesson ends with a diagnostic phase [2]. Although educational process at schools includes lots of different activities, majority of people agree that the most noticeable and unforgettable are those related to checking the fulfillment of educational aims. It means testing and assessing student´s written or oral performance. The essence of assessment lies in the process of comparing. Teachers compare students´ actual knowledge or skills with the current standards or norms. As a result, students are classified with a school-mark, which represents the level of their knowledge mastery [3]. Classification can have different forms. Countries like Great Britain or United States of America prefer classification with alphabetical letters from A to F, often divided into subcategories using mathematical plus or minus signs. In this system A means excellent mark and F means failed. In Slovakia, students are classified with numerical school-marks from one to five, whereas one stands for excellent performance and five for unsatisfactory performance. However, in some other countries the classification hierarchy is vice versa. [4]. As it comes to physics, school-mark 1 is supposed to be given to excellent students who understand basic principles of physics terms, phenomena, laws as well as mathematical formulas of these laws and relations between individual physical properties. Not only should these students understand the physics theory, but also they should be capable of applying theory into practice. This means they can solve different types of physics tasks independently. They know how to provide physics experiments without any significant help of the teacher. Moreover, they can process measured data and interpret the results. Grade-one students usually show high interest in the subject matter of physics. On the other hand, students graded with the second best school-mark (2 = commendable) are supposed to have similar characteristics as those mentioned above; however, they are less independent and often make minor mistakes. Mark 3 should be given to students with good level of knowledge mastery. Although do these students know some physics theory, they fail to explain it accurately. Therefore, their performance during oral examination is quite confusing. Furthermore, students are less independent at solving physics task or during laboratory measurements. However, with teacher´s help they can overcome these problems quite easily. Students classified with school-mark 4 have satisfactory level of physics knowledge that is still enough for passing to another school-year. However, such knowledge is considered to be just formal, superficial and short-lasting. For this reason, students cannot apply physics theory on laboratory experiments or when solving

quantitative physics tasks. These students need teacher´s help in almost any activity and show little interest in physics. Last and worst possible classification is mark 5 equaling unsatisfactory. It is used when students are very passive and absolutely not being interested in studying physics and preparing for the lessons at home. Students do not know the very basics and have huge information gaps in physics knowledge. Unfortunately, they do not even care about it [5]. Classification of students is closely related to summative assessment. It is usually done twice a school-year. Once, as a continuous assessment at the end of the first semester and other time as a final school-year assessment. The main aim of summative assessment is to determine the results of formal teaching-learning process, its effectiveness, and also to find out whether the planned educational goals have been fulfilled. This includes the need of determining the level of students´ knowledge, skills and other competences [3].

3. Motivation and interest

Motivation is the stimulating aspect of the students' activity and the reason for their actions. It is one of the basic preconditions for using the intellectual potential of students. Generally, motivation in being understood as an aspect, which directs, activates and energizes human behavior. Motivation is conditioned by emotions. Positive emotions evoke positive motivation. In this case, people search for opportunities dealing with the subject of their interest, they approach it, focus on achieving something in that field and stay active for quite a long time. On the other hand, negative emotions evoke negative motivation. People avoid doing activities which make them feel not comfortable, therefore; they try to escape them [6]. Pedagogical psychology distinguishes two basic types of motivation, namely external and internal. External motivation is related to external influences that make students learn. Mostly, it is students' attempt to avoid punishment. Although students study in their free time, they do not like it and do it only because they have to. However, internal motivation means that impulses, stimuli for studying or doing any favorite activity comes from students´ inner self and initiate students´ own learning [7]. Interest is generally considered to be one of the most influential motivating factors determining students' desire to learn. It is one of the most important factors stimulating creativity and creative attitude towards any activity that is being done. From personal experience it is known that any activity performed with reluctance or coercion, missing the signs of an individual's interest in participating in such activity, is very ineffective. On the other hand, interest supports development of intellectual side of students, increases their ability to maintain attention and, last but not least, the ability to be able to concentrate [8]. We encounter cognitive interest in the professional literature for the first time in the works of Ščukinová [9], who defines cognitive interest in the following way: "*it is a person's selective focus on learning about objects, phenomena and natural laws of the world around us, activating mental processes, human activity as well as their cognitive possibilities*."

4. Characteristics of physics

Formal physics education is a type of education in which a student acquires new knowledge, abilities and skills related to the science subject of physics. This acquisition of physics knowledge is tied exclusively to the school environment. This means that it takes place in an organized and pre-planned manner during lessons as a part of the educational process. The place of physics education is a school classroom or a physics laboratory. Formal physics education is stably anchored in the State Educational Program, the content of which is under the responsibility of the Ministry of Education, Science, Research and Sport of the Slovak Republic. This key educational document contains clear and binding regulations for the formal way of education implemented at schools. In addition to setting general educational goals, it also sets out the framework content of education and the key competences to which school education should be directed. The state educational program further defines which subjects will belong to the compulsory subjects and classifies them into the relevant educational areas [10]. In the following table we present the Thematic units of physics, which primary-school students have to deal with.

Table 1 Thematic units of primary-school physics

Year of study	*Name of thematic unites*
6th grade	Properties investigation of liquids, gases and solids. Behavior of bodies in liquids and gases.
7th grade	Heat and Temperature. Investigation of substance state changes.
8th grade	Force and Motion. Mechanical work and Energy. Light.
9th grade	Magnetic and electrical properties of substances. Electric current. Acoustics. Astronomy.

5. Research

Main aim of this work is to examine possible interrelations between the students´ summative assessment from physics lessons and their attitude towards studying physics. We want to find out to what extent obtained final school-marks reflect students´ internal motivation to spend their time preparing for physics lessons. According to Lanina [11], students with higher level of interest focus their attention on only one or a few particular thematic units of the subject. Therefore, we assume that talented students showing higher level of interest in physics can often be graded with worse marks as a matter of fact that even though they like physics in general, they are not interested in the topics being taught at certain part of the schoolyear.

5.1 Attitude to physics

In the beginning of this research, a questionnaire was prepared and given to primary-school students in a printed form. This was done in order to find out their attitude towards physics as a school subject. Moreover, due to the questionnaire, the authors of the paper were able to detect to what extent the participating students were interested in the subject of physics. The research showed that most

students have neutral feelings about physics. It means they are neither excited about it, nor resistant. These students represent exactly 51.5 % of the research statistical group. Surprisingly, more than 40 % of students claimed that their feelings about physics are positive. They also stated that the main reason of their positive attitude towards physics is their physics teacher. Students have appreciated teacher´s approach, methods he/she uses, positive class atmosphere that is being created as well as the so called safety class environment. Students are not afraid of saying their physics thoughts aloud. Only 5.2 % of students had strong arguments against physics. It differs on the emotional scale from don´t like physics through can´t stand it to absolute hate of physics.

Table 1 Students´ attitude to physics

Attitude to physics	*Number of students*
Negative feelings	10
Neutral feelings	100
Positive feelings	84
Total number	194

5.2 Assessment versus Interest

Students with negative feelings about physics are exactly those who said they were absolutely uninterested in the subject of physics. On the other hand, students with neutral and positive attitude showed a certain level of interest in physics study. In Table 2 we can see, that even though one specific student does not like physics at all, he or she was able to be assessed with the best school-mark. Similarly, two of ten uninterested students were classified with the second best mark, meaning mark 2 (commendable). Although we expected that students interested in physics would be graded mostly with mark 1 (excellent), the research showed that their final assessment ranges from 1 to 4. What is more, the first three classification marks were obtained by similar number of students. We can also read from the Table 2 that the number of students graded with mark 1 is almost the same as the number of students who got mark 2. The ratio of these students can be in terms of statistics considered 1:1. Mark 3 was given to 51 students from 184 who showed some signs of interest. This makes 27 %. Finally, nine students interested in physics were classified only with a satisfactory assessment (mark 4), which is almost 5 % of the studied group.

Table 2 Absolute frequency of final school-marks obtained by students interested and uninterested in physics

Category	*Mark 1*	*Mark 2*	*Mark 3*	*Mark 4*
Uninterest	1	2	3	4
Interest	63	61	51	9

In order to get more accurate results, we have used Lanina´s methodology to categorize the students interested in physics according to the level of their cognitive interest. Therefore, we have created three research subgroups, including students with low, medium and high level of cognitive interest. Absolute frequency of each school-mark given to these students is clearly recorded in the following table. It can be seen that students with low level of interest tend to have mark 3 (good), however; the frequency differences in getting other marks is not very significant. As we supposed, students with the medium level of interest have a bit better results than the previous subgroup. In their case, mark 2 (commendable) is the most frequent form of assessment. The final subgroup is represented by students showing a high level of cognitive interest in physics. We have confirmed that most of these students are classified with the best possible school-mark (1 = excellent). Moreover, no student from the subgroup was assessed with mark 4, which still represents a satisfactory result.

Table 3 Absolute frequency of final school-marks obtained by students of different level of interest in physics

Level of interest	*Mark 1*	*Mark 2*	*Mark 3*	*Mark 4*
Low	29	27	36	8
Medium	19	27	10	1
High	15	7	5	0

5.3 Chi square test of statistical significance

One of the goals of this work was to determine the existence of a statistically significant dependence between the final assessment of students and the level of their interest. For this reason we have provided a Chi square test of statistical significance. Due to the fact that the observed absolute number of students not showing the signs of interest in physics is lower than 5 in each field of the contingency table (see Table 2), we had to reduce this table according to the rules of statistics. As we cannot completely exclude uninterested students from the provided research, it is recommended to join them with the category that is closest to them. For this reason, we have unified the category of uninterest with the category of low interest. Statistical analysis of the obtained data will this step affect to a minimal extent, so we can consider it negligible.

Table 4 Results of Chi square test

Test Statisticsa,b	
Chi-Square	14.621
df	3
Asymp.Sign	,002

With the use of computer statistical program we were able to detect a Chi-square parameter. We found out that in this specific case it takes the value of 14.621 and the degree of freedom equals 3. For the stated degree of freedom and the significance level of 0.05, the standardized value of Chi-square corresponds to the number of 7.815. After comparing the research value with the standardized one, we can see that the standardized Chi square is lower. This is a proof of statistical significance between the examined parameters. Furthermore, a statistical p-value was determined to be of 0.002. P-value is a parameter representing the lowest significance level at which the significant relationship between the variables is being proven. Since the p-value is lower than the one chosen by

us (p = 0.05), we have definitely confirmed that there is a significant dependence in the level of interest in physics between students with different grades from physics.

6. Conclusions

In this paper, we have analyzed students´ attitude to the subject of physics and their feelings about it. Moreover, we have dealt with the issue of cognitive interest in physics in relation to summative assessment of primary-school students. With the use of statistical program we have evaluated the influence of the end-of-year mark from physics on the level of students´ cognitive interest. Providing a Chi square test of statistical significance we have confirmed that there is a statistically significant dependence between the tested parameters of interest and final grades.

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Session: History, Sociology

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THE CONCEPT OF BASIC BARRIERS TO SOCIAL COMMUNICATION BETWEEN A SOCIAL WORKER AND A CLIENT

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Abstract: *The paper deals with the concept of the basic division of barriers to social communication. The main goal is to bring a new view to the categorization of frequently used barriers in social communication. This concept is established upon the communication process between a social worker and a client. It can be applied in a variety of helping professions. Based on the transactional model of social and effective communication possibilities of barriers are identified, which are then compared with barriers from various fields such as psychology, marketing, management, and others. These are subsequently divided according to encoding/decoding (internal) or channel/message (external). The table presents the basic barriers, which often occur in social communication. The list of barriers is not exhaustive.*

Keywords: *social communication, barriers, effective communication, transactional model*

1. Social communication

Communication is an important part of the work between a social worker and his/her client. It reflects the effectiveness and quality of problem-solving. Communication can become optimal, but it can also cause misunderstandings or conflicts. In social sciences it is referred to as "social communication" however, this terminology is characteristic of the Slovak republic, while internationally a term "human communication" is preferred. For the purpose of this study, We will adopt the term social communication. Professor Gabura [1] defines social communication as a "phenomenon which is an integral part of social interactions." An alternative definition is proposed by Wallance [2] who defines it followingly: "Social communication includes social interaction, social knowledge, pragmatic language (verbal and non-verbal) as well as receptive and expressive language possessing" Workers in the helping profession use social communication as a tool for communication, exchange of information or as a problem-solving tool. Everyday contact with this tool requires care which has an effect on the effectiveness of work with clients. Effective communication in helping professions must be comprehensible and capable of acceptance. It should be accurate, effective, and positively oriented towards finding an optimal solution, which should be acceptable for both sides of the communication. Klinckova defines effective communication as the one which:

- *„removes barriers of society*
- *considers the partner position of the percipient*
- *improves itself,*
- *is an effective tool for building a carrier,*
- *teaches to accept positive and negative critique. "*[3]

2. Barriers to social communication

Human imperfection is the cause of barriers in communication that limit or disable the interaction between the communicators. Frączek defines communicative barriers of social communication as: "obstacles in the communicative process. They have a negative connotation and deform the communicative process." Barriers occur in both verbal and non-verbal forms of communication. Verbal communication is often a conscious process affected by the cognitive site of the communicant, his or her attitude as well as socializing elements. On the other hand, the non-verbal form is subject to the unconscious presentation. Therefore, the occurrence of barriers is often presented by the unconscious means of the communicator.

The communicative process is represented by models of social communication. Among the most renowned authors of models of communication are Harold Lasswell (1948), Claud Shannon a Warren Weaver (1949), Charles Egerton Osgood a Wilbur Schramm (1954), Georgea Gerbner (1956), D.K. Berlo (1960), Raymond A. Bauer (1964), Watzlawick, (1964), Barnlund (1970), Robert K. Merton (1977), Denis McQuail (1981), DeVito (2009), and many others.

In this article, I use Figure 1 according to the transactional model of social communication by the author Barnlund [4] from 1970.

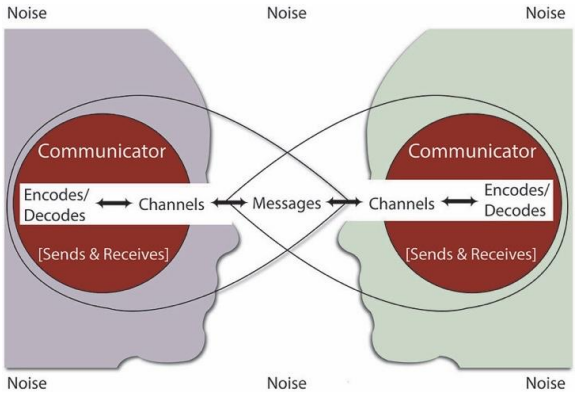

Figure 1: Transactional model of communication

Transactions between communicators are continuously sent and received. The communication process is characterized by the transaction of both verbal and non-verbal information, which are encoded/decoded and sent/received by the communicator. We can measure the in/effectiveness of communication-based on the choice of channel, method of sending and receiving messages, and various external elements which affect the communication. Factors limiting, preventing, or affecting communication in an unwanted way are referred to as barriers to social communication.

2.1 Internal barriers to social communication

According to the transaction model of social communication, we divide barriers into two homogenous groups. The first group is focused on obstacles in the communication of the communicator himself, these are called internal barriers. They are acquired during upbringing and are influenced by the environment. These barriers are formable and can be changed depending on the communicant. Internal barriers limit or prevent the encoding and decoding of messages. We divide them followingly:

- somatic barriers,
- psychic barriers,
- social barriers,
- linguistic barriers.

Somatic barriers

We also refer to them as physiological, they are mirroring somatic problems of the communicator. The most common somatic barriers are disorders of the oral spectrum that limit the verbal function of communication. A damaged part of the nervous spectrum has a strongly negative effect on non-verbal communication. These barriers are based on the physiology of the communicator. Certain somatic barriers can be congenital or acquired during life.

Psychic barriers

Psychic communication barriers are listed among the most common problems in communication. Their production is mostly unconscious, and they interfere with verbal and even greatly with the non-verbal part of the communicant. The effect of psychic barriers sometimes transforms into somatic form and thus they are referred to as psychosomatic barriers. Given that the majority of psychic barriers in produced unconsciously has their removal frequently a long-term character. According to Rogers [5], the failure in communication with oneself is the cause of ineffective communication with the environment. Psychic barriers also occur as congenital and acquired during life.

Social barriers

According to Kim et al. [6], social isolation is directly proportional to social barriers because it lacks an emotional connection and has insufficient feedback in real-time. Social barriers are closely related to the psychic. In addition to inadequate socialization, they include also cultural differences or various norms, laws, and traditions.

Linguistic barriers

Delgad [7] defines them as follows: *„language barriers can arise in all components of the language system, i.e. in phonetic, morphological, syntactic and lexical system of the language of a given culture (which we currently use) by the inference of mother tongue (pronunciation, grammar), or insufficient knowledge of the foreign language(vocabulary). They can also arise in metalanguage and other components of non-verbal communication ".*

2.2 External barriers to social communication

According to the transactional model of social communication is the second group of barriers rooted in the environmental effect on the medium or the message itself.

These barriers are referred to as external barriers of social communication. They have a negative effect on the communicational channel, which then limits or cancels the transaction between both communicators. We divide them into:

- spatial,
- technical,
- informational.

Spatial barriers

The majority of communicative processes in the helping profession are taking place indoors. The working process with a client requires a specific space, which supports optimal communication. Disruptive effects are inappropriate temperature, noise, or odour. Effective communication requires adequate spatial conditions which are adjusted for specific types of clients and their dysfunctions. For example, barrier-free access or noise-cancelling door.

Technical barriers

The communicative medium has an important role in the communicative process. Medius is the information holder in social communication i.e., message holder. Unlike informational barriers, technical barriers are related to the tangible objects- elements that transfer the information between the communicators. The limitation or failure of these elements is referred to as a technical barrier.

Informational barriers

According to prof. Machal [8] informational barriers mainly result from "overcoming lack and unavailability of adequate information". On the contrary, an excessive amount of information becomes an information barrier. An essential component of the accompanying information is also the content that requires truthfulness.

The concept of the barrier to social communication has several elements which are shown in Table 1. Please note that the Table does not include all barrier elements. It introduces the basic concept of division of significant and

frequent barriers from various authors across various scientific disciplines focusing on working with people.

Table 1 The concept of basic barriers to social Communication

Barriers to social communication	
Internal	*External*
Somatic ▪ headache, diseases, ▪ disability or loss of sensory organs ▪ disorders of the oral spectrum, mimic spectrum, body gestational disorders, ▪ physical handicap, ▪ psychosomatic disorders etc.	Spatial ▪ sound disturbing influences, ▪ inadequate temperature, odour etc.
Psychic: ▪ neurosis, anxiety, fear, depression, trauma, ▪ expectations, prejudices, stereotypes, preconceptions, ▪ anxiety, gasping, attention disorders, distraction, emotional disorders, intellect, psychosomatic disorders etc.	Technical: ▪ internet, software, electronics, ▪ post office, delivery services, ▪ barrier-free access, etc.
Social: ▪ cultural differences, social divergencies, ▪ norms, laws, taboo, values, feedback in real-time, ▪ inadequate socialization, bad relationships etc.	Informative: ▪ excessive amount of information, incorrect information, lie, ▪ bad orientation in information, incorrectly worded information etc.
Linguistic: ▪ pronunciation, grammar, vocabulary, ▪ paralinguistic means, ▪ dialect, significance, foreign languages etc.	

Effective communication requires the communicator to work with his/her verbal and non-verbal skills. Removal or realization of certain barriers is the first step of effective communication. Given that effective communication is subject to repeated work as it progresses, it is also necessary to prepare supporting elements of social communication [9] such as acceptance, congruence, assertiveness, feedback, and more.

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COGNITIVE APPROACH IN THE CZECH SYSTEMATIC MUSICOLOGY OF THE 2ND HALF OF THE 20TH CENTURY

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Abstract: *The discussion paper approaches the issue of cognitive approach in Czech systematic musicology in the second half of the 20th century. It deals with the origin and development of cognitively conceived musicology in the Western cultural circle, and the establishment of specialized workplaces for sophisticated cognitive-musicological research here. At the same time, in a post-socialist perspective, it addresses the question of the possibility of adapting modern, musical-cognitive theories to research in the countries of the former Soviet bloc. The core of the text is the presentation of the cognitive approach in individual disciplines of Czech systematic musicology, in the specified time period.*

Keywords: *systematic musicology; cognitive neuroscience of music; music theory; Czechoslovakia*

1. Introduction

Systematic musicology is a set of theoretic-epistemological disciplines, and in relation to music it covers knowledge from the musical matter itself, through the perception and physiology of the listener, to the complex social, cultural and pedagogical contexts of music in the life of a society. The concept of systematic musicology, as an independent branch of musicology, was established in the 19th century, with the emergence of musicology as an independent and recognized scientific field. One of the early works, which helped to clarify the position of systematic musicology in the field of the musicology as a whole, was Guido Adler's musicology systematics, published in his paper "*Umfang, Methode und Ziel der Musikwissenschaft*" from 1885 [1] [13].

The changes of the structure of musicological systematics reflects the nature of branch transformations and developments [7] [8]. Musicology responds dynamically to the expansion of its knowledge base with the new systematizations of the field. In musicology, the innovations appear in both conceivable ways - from above ("top-down") and from below ("bottom-up"). While as an innovation of the systematics "from above" we can understand the conceptual establishment of a new branch or department, musicological innovations "from below" comes spontaneously, with the emergence of new research impulses, and subsequently musicological texts and research works that arise spontaneously [3]. Systematic musicology, which is understood in various ways, is also undergoing this enrichment, when new knowledge is being incorporated into its canon.

These innovations of the field, present in musicology from the very beginning, are also followed by the emergence of cognitive musicology. In the broadest sense, Helmholtz's work *"Lehre von den Tonempfindungen*", first published in 1863, can be considered a founding act in the field of cognitive understanding of music. This key work of music psychology is already open to cognitive questions. In the current sense of the word, cognitive musicology is an interdisciplinary discipline, based on cognitive neuroscience, concerned with computationally modeling musical knowledge with the goal of understanding both music and cognition [10]. However, a long and thorny developmental path throughout the 20th century led to this narrower conception of cognitive musicology [2] [4]. The current grounding of the profiling of this discipline is then accompanied by extensive empirical research in specialized music-cognitive laboratories, the origin of which is characteristic especially for the Western world [14].

In Eastern Europe, the former socialist bloc, efforts to develop cognitive musicology, in today's definition, are delayed, which is mainly due to the socio-political context. Efforts to develop cognitive musicology, understood in the narrower sense, have been evident here since the 1990s, after the collapse of the Eastern bloc. However, the creation of specialized workplaces is still more or less awaited.

In an effort to connect the currently evolving tendencies of cognitive research in the West, to the research of the same area in the states of the former Eastern bloc, an interesting probe is a look at the theories and concepts developed in this area before the collapse of the Eastern bloc. After 1945, distinctive concepts of the importance of music for humans, concepts of processing music information, and other topics close to today's cognitive perspective developed on the territory of this area. Many interesting things can be discovered when examining the cognitive characteristics of these concepts. Their study is then important for the possibility of connecting and compatibilizing Western, contemporary theories to these theoretical concepts of the East, which have been evolving for several decades [9].

The aim of this paper is an introductory reflection on the conditions of Czech systematic musicology of the second

half of the 20th century, and specifically its cognitive tendencies, for the connection and development of theories of specialized cognitive musicology as they developed in the Western world during the 20th century. From a post-socialist perspective, we will see the events and research efforts of Czech provenance, which are closely related or resonate with the cognitive approach in the current sense. The main contribution of the text should be to make these Czech tendencies accessible to the Western world, and to balance their perspectives for compatibility with current research topics of cognitive musicology.

2. Systematic Musicology in Czech Lands After 1945

The year 1945 is a milestone in the modern development of systematic musicology in Czechoslovakia. In addition to the end of World War II, and the search for a new social order, the year is also a year of the death of an important Czech scientist, musicologist Vladimír Helfert (1886 - 1945). Another symbolic milestone in the history of Czech systematic musicology is the year of the communist coup, the year 1948, which is primarily responsible for fundamental institutional changes and changes in the organization of musical life.

Important stimuli for the development of systematic musicology in the Czech lands had been appearing continuously since the second half of the 19th century. The works of Otakar Hostinský (1847 - 1910), Leoš Janáček (1854 - 1928), Otakar Zich (1879 - 1934), Alois Hába (1893 - 1973), or Josef Hutter (1894 - 1959) bring important stimuli to systematic musicology, often synthesizing contemporary knowledge of music theory, aesthetics, music psychology, psychoacoustics and other disciplines. And it is the connection and reference to these pre-war efforts of systematic musicology in the Czech lands that became the basis for the development of the post-war professional tradition.

An important bearer of the tradition was also the post-war publication of the collection "*Musicology*", a collection for musicology and criticism, founded in 1938 by Vladimír Helfert. In the post-war years, many important studies from the historiographical and systematic (including ethnomusicology) branches of musicology were published on the platform of this collection, even before the founding of the Czech journal "*Musicology*" (1964).

For the post-war representation of the disciplines of systematic musicology within the research and pedagogical portfolio of individual institutions, it is possible to define three important centers within the Czech lands, which were part of Czechoslovakia. They are Prague, Brno and Olomouc. In addition to the *Faculty of Arts* and *Pedagogy of Charles University*, which specializes in Musicology and Music Education, there is also the *Academy of Performing Arts*, founded in 1945, as well as the musicological department of the *Czechoslovak Academy of Sciences*. In Brno, musicology is practiced at the *Faculty of Philosophy* of *Masaryk University* (formerly *Jan Evangelista Purkyně University*), at the *Faculty of Education* the field of Music Education develops, and at the *Janáček Academy of Performing Arts*, established in 1947, music theory and composition theory have an irreplaceable place, and theory of interpretation. *Palacky University* in Olomouc also has its *Department of Musicology*, which was founded in 1946, and for a long time it functioned in conjunction with the *Department of Music Education* at the *Faculty of Education of Palacký University* [6].

As for the main research trends, certain waves of interest in related blocks of topics can be observed, linked by the research paradigm, escalating across various disciplines of systematic musicology.

The period after 1945, for example, deals with new possibilities in the study of folk song, and the discussion of access to folk song continues after the coup d'état in 1948. The 1950s are influenced by political events, and official, published research reflects on what was allowed to explore. Nevertheless, the 1950s bring some significant systematic works, both in Janáčkian research, in the issue of folk song, and last but not least in music theory (the work of the theorist Karel Janeček and Jaroslav Volek).

The 1960s, which meant softening in socio-political conditions, brought the development of new research approaches and research perspectives in musicology. In Czech systematic musicology, the influence of cybernetics, analytical philosophy, information theory, experimental methods and formal sciences is beginning to appear. The field of intonation theory, which has its roots in the 1950s and permeates various disciplines of systematic musicology, is also developing more. In the 1960s, a greater number of impulses from the Western world also appeared Czechoslovakia (which is represented, for example, by collection "*New Ways of Music*" (published in 1964 and 1970) or a visit of composition courses in Darmstadt by Czech composers in 1965).

The 1970s are characterized by the beginnings of the use of the automatic computer in research, and the growing interest in the use of mathematical and statistical methods in musicology. At this time, musical semiotics also began to emerge, which is evidenced by the establishment of the Interdisciplinary Team for Expression and Communication Systems in Art. Later the "Prague team for music semiotics" was established, whose research efforts subsequently culminated in the 1980s. The 1970s also brought an empirical, comparative study of musical interpretation, and the development of musical sociology.
After 1989, the disciplines of systematic musicology developed rapidly, following the new possibilities of a free and open society. There is an interdisciplinary interconnection of individual, hitherto separate research directions, either within musicology or in a broader concept of the arts. At the same time, there is a certain synthesis of current Czech research in the field of systematic musicology, but a comprehensive critical evaluation of the developmental shifts of the area across

disciplines for the entire second half of the 20th century, however, is still lacking [6].

3. Cognitive Approach in Czech Systematic Musicology after 1945

It might seem that the frequency of occurrence and further development of the cognitive approach in Czech (hence Czechoslovak) musicology are directly dependent on the efforts of music psychology, but this is not the case. In 1988, the author's team, led by Vladimír Lébl and Ivan Poledňák, mentions in a three-volume publication "*Musicology*" a critical remark that music psychology has not yet developed in Czech musicology as an independent and emancipated discipline [6]. The authors thus respond to the considerable fragmentation of musical-psychological texts and research tendencies in Czech musicology, passing through various disciplines and crossing many contexts.

Although efforts fulfilling the characteristics of a cognitive approach are fragmented, their occurrence across disciplines and contexts can be seen as a comprehensive discourse of its kind. Its outcome is the post-revolutionary development of some Czech research approaches after 1989, which meaningfully link the topic of music psychology and a specialized focus on the laws of music cognition. (For example, the habilitation thesis of Prof. Jiří Luska "The development of hearing for harmony in ontogenesis", submitted in 1998.) However, the starting points of the cognitive approach in Czech musicology are broader than purely musical-psychological, and reflect in themselves in which cognitive tendencies emerge.

The permeable nature of the cognitive approach, which has a broader base than the psychological psychology itself, can quite well illustrate the example from 1997. In the Dictionary of Czech Musical Culture we find a definition in which there is significant cognitive approach, specifically in the definition of *"Musicology"*. (The motto "*Musicology*", by Jiří Fukač and Jaroslav Volek.) The authors state:

"*Phenomena such as music, musical culture and musical life, but also partial phenomena such as notation, musical instruments, music education, cognitive reflections of music, etc. are illuminated as a diachronic synchronous continuum and discontinuum, ie in the unity of historical and systemic dimensions. (...) With a certain part of its work capacity, musicology also turns to the study of cognitive reflections on music (as a phenomenon relevant to music), ie, among other things, to its own history, systematics and current subject issues.* " [11]

The very term *"cognition*", or the nickname "*cognitive*", is not a reference for the onset of cognitive tendencies in Czech systematic musicology after 1945 - the term itself has been present in relevant periodicals a few times since about 1973, and in the 1990s the frequency of its use increases. However, the individual cognitive processes and cognitive functions are important, the occurrence of which can be observed in music periodicals and professional publications. When focusing on "musical thinking", "musical perception", "musical consciousness", "musical memory", or "musical imagination", you can find networks of reflections and sophisticated scientific assumptions, crossing individual scientific texts and publications.

From these cited indications it can be concluded that a separate cognitively oriented current is not developing in the Czech musicological tradition of the 20th century, but latent tendencies of cognitive approach to the issue can be seen across variously profiled texts. In the following part, we will try to map these tendencies in individual musicological disciplines.

4. Disciplines of Czech Systematic Musicology and the Cognitive Approach

The scope of individual disciplines of systematic musicology in post-war Czechoslovakia was never strictly separated, and the classification of individual publications for individual disciplines is often mainly indicative. Disciplines such as music psychology, aesthetics, music theory or music acoustics tend to permeate certain key points, and the outcomes are all the closer because the authors across the disciplines are the same musicologists. And it is precisely specific personalities who are important for the development of individual disciplines - in contrast to the quite variable institutional situation, moreover influenced by restrictions after 1968, and with the advent of normalization. Let's now investigate the individual disciplines.

Regarding the post-war development of acoustics research in Czechoslovakia, it is necessary to draw attention to two lines of development - industrial acoustics (and also electroacoustics) and music acoustics. Antonín Špelda (1904 - 1989), Antonín Sychra (1918 - 1969), Vladimír Lébl (1928 - 1987), Miloš Bláha (1934), and Václav Syrový (1946) are among the leading figures in the research of musical acoustics in the post-war period. It is in the work of Antonín Sychra that we find a number of stimuli standing at the interface of acoustics and psychology, which could be understood as cognitive in today's sense.

A number of authors entered the Czechoslovak platform of post-war music theory. In addition to the uncertain constitution of music psychology, we find many tendencies to understand cognitive processes in relation to music. Let's name the works of theorists Karel Janeček (1903 - 1974), and Karel Risinger (1920 - 2008), and musicologist Jaroslav Jiránek (1922 - 2001).

Music psychology was cultivated in the period after 1945 mainly as a part of music pedagogy. An exception to this tendency is the work of Josef Burjanek (1915 - 2006), one of the last pupils of Vladimír Helfert (1886 - 1945). Burjanek focused his attention on the psychology of melody (dissertation "Psychology of Melody" from 1939), and later dealt with Otakar Zich's legacy and the issue of

musical thinking. The works of the already mentioned Antonín Sychra are also important. The issue of music psychology also occurs in the writings of the working team for music semiotics, from whose circle the musicologist Ivan Poledňák (1931 - 2009) made a significant contribution to music psychology [12]. Other works important for Czech music psychology, in which an experimental approach already exists, are by Jiří Kulka (1950) or Marek Franek (1956). In the 1990s, the trend of consistent empirical work in music psychology, connected with cognitive aspects, appeared in the Czech environment. This new synthesis is represented, for example, by the works of Jiří Luska (1951).

In the Czech environment, not only music pedagogy, but also music aesthetics and semiotics are close to music psychology. In addition to the already mentioned Antonín Sychra and Jaroslav Jiránek, it is necessary to mention the works of Jaroslav Volek (1923 - 1989), Miloš Jůzl (1928 - 1996), Jarmila Doubravová (1940), and especially Jiří Fukač (1936 - 2002), which have characteristics of cognitive approach.

In the field of music pedagogy, the cognitive approach flashes in the works of František Lýsek (1904 - 1977), Libor Melkus (1921 - 2013) and František Sedlák (1916 - 2002). These authors focused mainly on auditory education, as well as the issue of musicality, in which they follow the work of Vladimír Helfert [5].

Selected researches in music sociology also rely on the concept of "musicality". Let us mention the important researcher Vladimír Karbusický (1925 - 2002) for the development of post-war music sociology. Mikuláš Bek (1964) also comments on the issue of cultivating hearings.
The last discipline of systematic musicology that we mention is the theory of musical interpretation. In this area, in the Czech environment of the second half of the 20th century, there is a remarkable number of works of an experimental nature. Miloš Bláha (1934), Milan Kuna (1932) dealt with this issue, and the works of Rudolf Pečman (1931 - 2008) and Jaroslav Zicha (1912 - 2001) represent a more theoretical orientation [6].

5. Conclusion

The complex and often confusing development of systematic musicology in the Czech lands after 1945 leaves open many questions about the possibility of using the knowledge gained by it, as well as application aspects of its theoretical concepts, which often have only vaguely demarcated contours of disciplinary affiliation and multiple interpretable starting points.

A historical study of these links may show unrecognised potential of those concepts, and similarities with foreign research standing at the forefront of scientific efforts. From a post-socialist perspective, however, it is necessary to consistently study and distinguish (political) discourses and tendentious theses, as well as dead ends of research, given by the acceptance of erroneous assumptions. This will require careful contextual criticism, and hard verification of the facts, and of the mechanisms described. This whole wide range of knowledge of the field of Czech systematic musicology awaits for its evaluation and verification of usability, especially the knowledge, that were at the forefront of musicology's attention before 1989.

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MULTICULTURAL COMPETENCES AND SKILLS IN THE PRACTICE OF SOCIAL COUNSELING

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Abstract: *As in most countries of the world, in Slovakia there are several cultures characterized by their own history, skin color, language, customs or values. The social counselor should therefore be prepared for a diverse clientele, in which it is appropriate to apply a multicultural approach, taking into account the uniqueness and specificity of the client's cultural background. The aim of the article is to identify the competencies and skills of multiculturally oriented social counselors based on the analysis and compilation of available domestic and foreign literary sources.*

Key words: *Counseling. Multicultural approach. Multiculturalism. Social counseling.*

1. Introduction

At present, in Slovak society we can meet people and groups from different cultures. According to several authors [18; 19; 7; etc.], such a society can be described as multicultural. The concept of multiculturalism according to Mistrík et al. [15] refers to the coexistence of several different cultures, between whose members there are regular or irregular contacts, which can take the form of cooperation, peaceful coexistence, indifference, but also hostility or deliberate hostile activities.

Cultural diversity is most often associated with differences in nationality, race, ethnicity or religion, but also includes variables such as gender, age, sexual orientation, disability or social class [9; 11].

In 2019, the Slovak Republic had a population of 5.1 million, of whom 86.82% had Slovak nationality. The remaining 13.18% were minority nationalities, dominated by Hungarian (8.77%), Roma (2.20%), Czech (0.73%), Ruthenian (0.58%), Ukrainian (0.21%).), German (0.15%), Polish (0.14%) and Romanian (0.11%) nationalities [25]. Other nationalities such as Russian, Bulgarian, Vietnamese, Austrian and others have a share of less than 0.1%. According to the authors Žilová, Novotná and Rusnáková [23], the diversity of nationalities coexisting in Slovakia does not cause serious ethnic problems, but they point to social problems connected with the Roma ethnic group and political problems concerning the Hungarian ethnic group.

The composition of the population of the Slovak Republic is also diverse in terms of religion, which can represent a significant aspect for individuals or groups affecting their quality of life and overall satisfaction. Eighteen churches and religious societies are currently registered at the Ministry of Culture of the Slovak Republic [26], among which, according to the last census of inhabitants, houses and flats from 2011, the Roman Catholic Church (62.02%) and the Greek Catholic Church of Augsburg (5.86%) have the largest representation. and the Greek Catholic Church (3.83%) [27].

The cultural diversity of Slovak society is also indicated by the statistical data in Figure 1, concerning immigrants who have acquired permanent residence in Slovakia. During the years 1999 - 2019, an average of 5357 foreigners came to the territory of Slovakia per year [25].

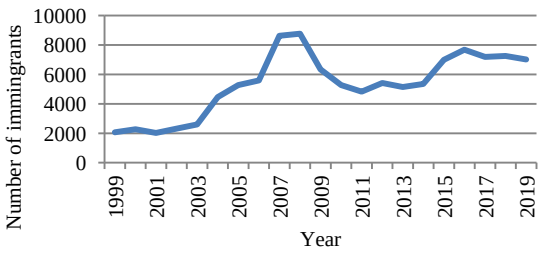

Figure 1: Number of immigrants to the territory of the Slovak Republic in the years 1999 - 2019 [25]

The composition of the population in the Slovak Republic was also affected by the European refugee crisis, which reached its peak in 2015. In the period 2015-2020, the Ministry of Interior of the Slovak Republic [24] received 1,334 asylum applications, of which 229 were positively processed.

The above statistical data show that the composition of the population in Slovakia is heterogeneous and can be distinguished and divided according to several characteristics such as age, gender, religion, nationality, etc. It is therefore clear that in everyday life we commonly meet people who are more or less clearly different from us, whether by their opinions, skin color, speech, behavior or cultural background. Mutual difference and multiculturalism are therefore a natural phenomenon also occurring in the profession of social counselor, who should be able to respond and work with cultural differences correctly by acting and dealing with the client.

2. Multiculturalism as part of the professional growth of social counselors

General qualification prerequisites for the performance of social counseling are set by the Act of the National Council of the Slovak Republic no. 448/2008 Coll. on social services [21] and the Act of the National Council of the Slovak Republic no. 219/2014 Coll. on social work [20]. However, they only state the required level of education and the length of practice with the selected target group.

More specific requirements regarding the necessary skills and personal prerequisites for the profession of social counselor can be found in several authors [16; 5; 14; 2; etc.]. According to them, counseling abilities, skills and qualities can be divided into the following categories:

- knowledge, skills, (knowledge of interview methodology),
- means of communication (verbal and nonverbal),
- relationships with people (interest in the client, sensitivity, respect for the client, etc.)
- the personality of the counselor (sincerity, trustworthiness, self - confidence, attitude towards the profession, etc.)
- self-reflection of the counselor (reflection of the counseling process, self-reflection of conducting the interview, ability to be objective, etc.).

From these assumptions and skills we can then select the elements necessary for a multicultural counseling approach, which several authors [1; 17] consider the fourth dimension in addition to three traditional counseling approaches - humanistic, dynamic and cognitive-behavioral. According to Kopčanová [11], it involves a synthesis of knowledge about different cultures, the counselor's cultural awareness and self-reflection regarding possible prejudices, stereotypes and attitudes of the counselor towards different cultures (Fig. 2). Sue et al. [In 11] emphasizes three key characteristics of a qualified multicultural counselor: (a) awareness of the counselor's own assumptions, values and prejudices, (b) understanding of the culturally diverse client's worldview, (c) development of appropriate intervention strategies and techniques.

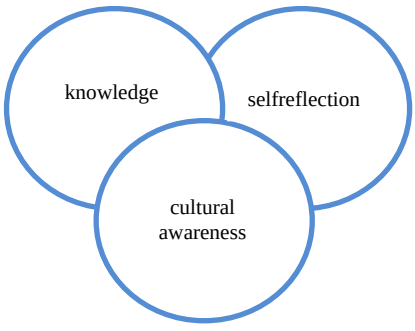

Figure 2: Synthesis of assumptions of multicultural counseling approach

The acquisition of appropriate knowledge, the ability to reflect on self-reflection and building of cultural awareness should be an integral part of the professional training of social counselors from the outset as it is a long-term process. As stated by Bennet [In 6], the acquisition of multicultural competencies consists of the following six stages:

1. rejection, resistance - the counselor is insensitive to the client, is unable or unwilling to understand cultural differences and often implements ineffective procedures due to incorrect interpretation of the client's behavior,
2. defense - the counselor recognizes and is aware of cultural differences, but considers them special and incomprehensible,
3. minimizing differences - the counselor tries to avoid prejudices and appreciates differences in culture, yet still misinterprets the client's behavior, opinions and reactions,
4. acceptance of differences - the counselor knows significant cultural differences and reflects them in the stage of diagnosis and intervention, at the same time realizing that understanding cultural diversity leads to overcoming obstacles in relation to the client,
5. adaptation to differences - the counselor works successfully within the diversity of cultures, is able to adapt to a foreign culture and communicate appropriately with the client,
6. integration of differences - the counselor is able to correctly identify the client's behavior, read his verbal and non-verbal expressions, respects cultural diversity, willingly acquires new knowledge and practical skills.

To verify the existence of possible cultural prejudices or even latent discrimination of the counselor against individual cultures, several available test methods can be used, including Kríž [12] presents a test of cultural adaptability, a questionnaire of ethnic stereotypes, a range of sympathies for nations or and other groups.

3. Competences and skills of multicultural social counselors

As mentioned above, a social counselor needs to have sufficient knowledge, skills and abilities needed to build relationships with different types of clients and solve a wide range of clients' social problems in the exercise of their profession. At the same time, the consultant's multicultural approach to clients requires a set of specific competencies and skills, as its essence is, according to Launikari and Puukari [In 4], the client's acceptance as an authentic being with a unique culture and history. Multicultural counseling can be spoken of when the counselor is aware of the differences between himself and the client and between individual clients, and at the same time reflects the importance of family and cultural factors that affect the client's perception of the world [Ivey In 11].

According to Haapenen [8], a multicultural counselor should find himself in multiculturalism, find multiculturalism in himself, be willing to learn about himself, continue to learn and grow multiculturally, and also be able to analyze different social contexts.

Suchožová and Šándorová [19] list three types of standards that a teacher should meet in the context of multicultural education in schools, and which, in our opinion, can also be applied in the field of social counseling. They are:

- content standards - the counselor knows the culture of his nation and region, he also knows other cultures and cultural phenomena,
- performance standards - the counselor is able to present a conscious cultural identity, is empathetic to the diversity of cultures, respects the individual needs of his clients arising from their cultural background, masters various methods and techniques for developing the client's cultural awareness,
- personality standards - the counselor positively evaluates the diversity of clients, values his/her own culture and has respect for other cultures, is capable of healthy self-reflection.

Essential professional and personal qualities of a multicultural counselor may include (a) ability and willingness to work with a foreign culture, (b) empathy, (c) ability to cope with uncertainty, (d) managing the role of cultural mediator, (e) ability to orient oneself in a cultural context [6].

Other cultural competencies are also offered by the authors Žiaran and Hrehová [22]. Like previous authors, they talk about the need to know their own, but also foreign cultures, the ability to appreciate cultural differences and respect the individuality of each client. In addition, they list skills that included cultural-competent communication, cultural-competent assessment, and cultural-sensitive care.
Cultural-competent communication includes both verbal and non-verbal components of communication. The verbal component is primarily speech, the language in which the counselor communicates with the client. It can be a foreign language that the counselor should be able to speak, resp. it should provide an interpreter, or it may just be a jargon that the counselor should learn when working with specific groups of clients. Non-verbal communication, in which we use facial expressions, gestures, touches, posture, distance and other types of non-verbal expression [13], is often much more informative. However, in intercultural communication it can be quite erroneous because non-verbal expressions of one culture may not have the same implications in another culture, so the counselor should be sufficiently acquainted in advance with certain specific manifestations of the behavior of his potential clients.
Assessment or diagnosis is one of the stages of the counseling process [5; 3]. According to Gabura [4], the assessment allows "the client and the counselor to look at the formulated problem in a broader context and allows to grasp the social configuration of this problem". Therefore, in the implementation of culturally competent social assessment, we consider it important to know the cultural background of the client and understand the relationship between the information that the client will bring to the counseling process, so that we can properly diagnose and solve client problems.

Culturally sensitive care can be explained by the example of the British system of surrogate family care, in which children are entrusted to the care of adoptive parents of the same ethnicity, thus ensuring the preservation and support of children's individual cultural needs while preventing assimilation to major culture conditions [9]. The counseling process is therefore about finding and mediating such social assistance and social services, which will also reflect and respect the individuality and authenticity of the client who was distributed to them.

4. Conclusion

Multicultural counseling is based on the awareness and acceptance of the differences between the culture from which the counselor comes and the culture from which the client comes. He is not always part of the majority society, with which the consultant is used to and ready to work. Therefore, multicultural education should be an essential part of the training and continuing education of social counselors, awakening and promoting awareness of their own culture, while providing them with knowledge and insights about other cultures. Awareness of cultural diversity should also be linked to the ability of self-reflection of possible prejudices or stereotypes of counselors towards certain cultures. Acquiring and applying a multicultural approach in a counseling relationship is a long-term process beginning with possible manifestations of rejection or resistance to a given culture and ending with the ability to integrate existing cultural differences. The multiculturally oriented counselor then has the qualities and abilities such as empathy, ability and openness to the diversity of cultures, willingness to work with clients from different cultures, or managing the role of cultural mediator. In addition, he has acquired the skills of cultural-competent communication, cultural-competent assessment and culturally sensitive client care, the application of which positively contributes to solving the client's unfavorable social situation and increasing the quality of his/her life.

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HYPERSPECIALISATION WITHIN HUMANITIES AND SOCIAL SCIENCES

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Abstract: *This paper briefly describes the overspecialization of humanities and examines its effects. It presents arguments for negative side effects: single-track mindedness and narrow mindedness. But it also demonstrates some exceptions: interconnections between philosophy and linguistics in the English-speaking world, and personalities with broad horizons.*

Keywords: *specialization, humanities, philosophy, linguistics, Chomsky*

1. Introduction

Specialization within humanities and social sciences started to take forms of hyperspecialisation. It became a trend within these disciplines. No matter which field within humanities, they all are split into subfields, and these in further subdisciplines. They continue to develop rather toward further and deeper specialization. It is so widespread that we already take it for granted and are not aware of its negative consequences. The trend is clearly seen at universities and other academic institutions with departments with full autonomy, split into independent sections. Every discipline is affected, but I will focus on philosophy.

1.1 Side effects of hyperspecialisation within humanities and social sciences

Hyperspecialisation must necessarily have some consequences such as insufficient connection, cooperation, and communication between disciplines, departments, and scholars. There are some exceptions, though (viz next paragraph). As a result of this, projects that are generated within the disciplines tend to be disconnected from each other, even though they are related. They remain separated. The reason for this might be the overspecialisation. Most groups of researchers or individual scholars are too focused on their own task to have time and reason to pay attention to unrelated projects [1].

The narrow or single-tracked focus might have negative consequences for the overspecialized researcher in question, if that person stops discovering things outside their specialization. There is a strong possibility that a narrow focus can go at the expense of broader general overview, especially if the persons stick only to their projects. It can produce forms of narrow-mindedness or single-track mindedness. But there are many exceptions to this (see other paragraphs).

1.2 Example of side effect of specialization within philosophy

Countless examples could be demonstrated to illustrate negative side effects of overspecialisation, but for now the following example from philosophy should suffice. There is a group of British and French philosophers such as Quinton Maillesseaux, Alan Badieu, Graham Harman, Ian Hamilton Grant, Ray Brassier, Levi Bryant who call their approach "speculative realism". I conducted a small survey to discover whether these authors and their work is known among other philosophers. The survey was small-scaled and only few were asked. But the results have indicated that philosophers do not know about this "school". I expressed my concern to Graham Harman [2]. He explained to me that this trend in philosophy is well-known, that I must have asked only analytical philosophers who pay usually very little attention to continental trends in philosophy, because they are more oriented towards the US scene. This observation was confirmed to me also by Ben White from the department of philosophy at Trinity College Dublin [3].

2. Examples of interconnections between Philosophy and Linguistics in the English-speaking world

The Oxford philosopher Timothy Williamson confirms [4] that apart from the English-speaking world, "the disciplinary cultures of both linguistics and philosophy have been less conductive to such connections" [5]. According to his knowledge, in the English-speaking world, the connections in the areas of philosophy and linguistics are somewhat better than in the rest of the world. He gives the following examples. Some connection between those two disciplines exhibits the Department of Linguistics and Philosophy at MIT in Boston/USA. These two sections are autonomous, but they produced scholars who have both – philosophical and linguistic – knowledge. One of the best examples is Professor Noam Chomsky. In the other parts of the world, however, those two areas have developed a much weaker connection so far. An example of connections are theoretical frameworks which emerged in philosophy and were then applied and adapted by linguists. E. g. "possible world semantics" was produced by philosophers Rudolf Carnap, Richard Montague, Saul Kripke, David Kaplan, and others. But it became a standard framework for formal semantics. The so called "situation semantics" was developed by the logician Jon Barwise and the philosopher John Perry, but it was applied by the linguist Angelika Kratzer. Other theoretical frameworks that emerged in philosophy first, and then were used in linguistics, are the following: Discourse

Representation Theory (Hans Kamp), conversational and conventional implicature (Paul Grice), theory of speech acts (J. L. Austin and John Searle), truth-theoretic semantics (Donald Davidson).

Another argument to support the fact that there are effective channels of communication between philosophers and linguists is that some well-known authors switched between departments of philosophy and departments of linguistics without changing their theoretical framework, e. g. James Higginbotham and Paul Elbourne. Angelika Kratzer is based in a department of linguistics, but she is actively engaged with philosophers.

Williamson argues that they are no disjoint groups because they have common subject matter, language. Their projects are only focused on different aspects. The relevance of their projects is recognized reciprocally. E. g. crosslinguistic studies or corpus-based studies are pursued by linguists. Studies of which logical principles are validated by a given semantic theory are done by philosophers. The differences are rather of statistical nature or in skills-set.

Many mixed conferences of linguists and philosophers take place. Noam Chomsky confirms Williamson's views [6].

In the area of philosophy and psychology, there has been a long and productive tradition in France, where these two disciplines are tied and studied together in French universities.

3. Exceptions to limitations of broader general horizons

Scholars are not necessarily negatively affected by their specialization. Eminent, both nationally and internationally renowned personalities usually have broad horizons exceeding their area of specialization. One of the examples is Professor Noam Chomsky, who used to specialize in linguistics, but whose spectrum of knowledge exceeds even humanities and social sciences. But even scholars who are famous only at national level demonstrate high standard of knowledge in areas in which they do not specialize. And many professors known only to their universities tend to overcome their specialization by profound insights into all areas of humanities, e. g. the Czech philosopher Milan Machovec (1925-2003). Also professors who might not be familiar to the entire university, but who are nevertheless exceptional in their field, also surprise us with their horizons that go far beyond their own field, e. g. Jiri Stromsik, former professor of German literature at the Faculty of Arts and Philosophy at Charles University.

These people show to us that our specialization does not necessarily have not prevent us from keeping broad horizons. It certainly should not serve as an excuse for our losing the overview.

4. Conclusions

If we already have to specialize, because it is required, then it is our responsibility to attempt to overcome it by trying to be familiar also with other areas. Conducting research in any area should not be pursued in such a way that does narrow and limit our horizons. The public would certainly welcome that.

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THE DRAGON RETURNS IN A SIGN OF FIRE

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Abstract: *The topic of the article focuses primarily on the semiotic analysis of the work The Dragon Returns, the author of naturism prose Dobroslav Chrobák and his film adaptation by director Eduard Grečner. It focuses on the meaning and symbolism of fire, cyclicality of time, myth, sign-aesthetic depiction, Christian and pagan motifs, ambivalence of characters, the opposite of good and evil and archetypes, which are symbolic classifications in the form of semantic oppositions in the literary work to film processing.*

Keywords: *film adaptation, intertextuality, interpretional perspectives, semiotic*

1. Semiotic

There are signs all around us. From a semiotic point of view, most characters can be interpreted in different ways. Quite a few characters are those that are precisely defined and do not allow different interpretations. These symbols are mainly used in science, where clarity of concepts is necessary for understandable reasons. The rest of the characters are characterized by polysemic, multi-character. A high degree of multi-characteristic occurs mainly in the fields of art, mythology, religion, etc., where a large number of different, often contradictory meanings can be assigned to individual characters [1].

The essence of the creation of a work of art is always the semiotic process. The artist encodes his thoughts and ideas using specific character systems. When decoding it, one of the semiotic methods applies, namely interpretation. This is not just about interpreting a work of art to a wider audience, but above all about the fact that the recipient himself interprets the work in some way and attaches some importance to it [2].

Character systems in art are, by their very nature, sharp, i.e., not limited and given. Therefore, the recipient can interpret the work of art to some extent freely and on the basis of his own experience and knowledge.

In this paper we will focus primarily on semiotic analysis and interpretation of the cult novel *The Dragon Returns*, which comes from the pen of the author of the prose of naturism Dobroslav Chrobák. We will offer an analytical view not only of the literary work, but also of the film adaptation. We focus on character-aesthetic depictions, Christian and pagan mythology, the ambivalent of the characters, the antithesis of good and evil, the birth and extinction often sympathetic to the complex way of life, towards a higher degree of self-recognition and spiritual transformation.

1.1 The birth of literary figure of the Dragon

When Dobroslav Chrobák was seventeen, he published his first short story with the short title *Les*. In it, a snake is depicted, i.e., a dragon that emerges through negative phenomen. Even in the exhibition of the novel *The Dragon Returns*, there is such a sequence: "*And suddenly the moon passed in thick clouds ... the houses were completely immobilized, as if all the fires and the whole village were extinguished in their bowels ...*" [3]. The situation is similar in the film, when the village suddenly falls silent and contrasts with everyday movement and prepares for an event that disrupts the traditional course. Silence turns to screaming when someone calls out burning. This episode is immediately followed by the arrival of the Dragon. And therefore, here too, the "Dragon" is associated with phenomena that disrupt the daily and steady cycle.

The connection of the Dragon with the fire is also reflected in Eve's memories - "*He drove them all into a corner, took a bottle of pure spirit from a Jewish shelf, poured it on them and set it on fire*" [4]. Therefore, at the level of collective consciousness, the equation Dragon = fire was constructed. *The Dragon's returns* is linked not only to the cry and disruption of the regular cycle in the village, but also in nature. "*The Dragon has returned about Jan´s*," a time when nature should also show the sign of harvest. However, there is drought all around and there are fires in the mountains, the opposite of St. John's fires. This situation is repeated for the second time. The first time the Dragon left the village and the second when he returned. The collective consciousness consciously evaluates it this way: fire is drought, drought is hunger, hunger is death, and all this is the "Dragon". The villagers attributed to Dragon all the adverse events, especially the fires and the mysterious deaths. Therefore, the arrival of the Dragon is a symbol of the negative, when the village believes that the removal of the Dragon would automatically eliminate all undesirable circumstances [5].

1.2 The film adaptation of the Dragon returns

One of the leading directors of the most fundamental era of Slovak filmmaking is Eduard Grečner, who contributed to the establishment of the Czechoslovak New Wave. The adaptation of the short story *The Dragon Returns* is undoubtedly considered the best director of the film. It

focuses mainly on the emotional states and feelings of the main characters, on the fragility of the inner world of man, all connected in connection with the social context. The poetics of the film also looks into the depths of man through introspection, which is also transformed into a symbiosis with natural phenomena and the world around it. The film can also be understood as a psychological probe and can be included in the category of psychological films. In connection with this issue of categorization of the film Macek with Pašteková, they look at this film through the concept of emotional film [6]. The intention of the film is not explicitly stated and the acting performances are adapted to this. For example, dialogues between heroes are not typical conversations of people who lead a conversation. They are encrypted in each scene of the movie. The percipient can understand them on the basis of correct decoding of, for example, movements, facial expressions or other acting representations and reactions. The intention of the film and one of the basic creative methods became the principle of secrecy. The character of the Dragon has been shrouded in mystery from the beginning. The mystery is also highlighted in a visual form through the Dragon, which has a tape taped over one eye and looks at the world with only one eye. According to critics, the film *The Dragon Returns* brought elements of "introverted realism" resulting from the basic conflict of the work into Slovak cinema, where individualism and collectivism stand in opposition. Philosophically, he plunges into silence, through which he tries to say as much as possible.

From pieces of emotions, feelings, thoughts and unspoken words, the director composed a mosaic of an individualistic story that is unobtrusive and still current.

2. The cyclicality of life in Dragon´s depiction against the background of binary oppositioins

Already at the beginning of the work, we encounter the cycle and cycle of life through Dragon's return to the village. The cycle of life is transformed into a cycle of nature that behaves alive and is directly involved in human destinies and stories. We see a symbiosis between life as such and natural life. The names of the main characters are not selected at random. They foreshadow their destiny. The main protagonist has the original name Martin Lepiš, but - as we know - its origin is unclear and complicated. His nickname Dragon is perceived negatively in our Christian realities, he is also considered a mythological animal. It is the embodiment of chaos and devastation despite the struggle of St. George with a dragon, which we can perceive from a profane-demonic and sacral point of view.

The name of the main female character Eva is the most frequent female name in our literary realities. The free translation of the name Eva means "*the one who gives life*", again a motif of cyclicality and the cycle. Eva, the first woman ever and according to folk etymology, the "*mother of all the living*", descended from Adam's rib. The first two people standing at the birth of the world. Eva symbolizing hereditary sin and guilt, the beginning of creation and its fall, life and death. These parallels are visibly evident with the main characters and the storyline. At first, Dragon's Eva fell blindly in love with the hated and condemned Dragon, taking the blame. As well as Adam's Eva, who was guilty of her deed. She disobeyed God and tasted from the tree the knowledge of good and evil, thus committing sin. The central character who appears in the work is also the character of Šimon Jariabek. In the Bible, the name Šimon is associated with betrayal. St. Šimon Peter, one of the twelve apostles of Jesus originally named Šimon, was guilty of denying Jesus three times, although he later regretted it and forgave him. In our context, there is a conflict between two prominent figures - Dragon and Šimon, as in the biblical analogy. The conflict between Dragon and Šimon can be understood as a competitive struggle between two male elements. The character of Šimon hides the most significant transformation potential in the work. He acts as a bearer of traditional values, a conservative order, and yet he is influenced by the instincts of jealousy, according to which he finally acts. The Dragon's origin shrouded in mystery and the predestination of his otherness profiled him not only an outcast but also the figure of a wanderer. Wandering is a popular and frequent motif in the prose of naturism.

From the very beginning, the emblematic figure of the Dragon has been accompanied by dark forces and attributed inexplicable events from fires, enormous drought, crop failure to death. The cyclicality of time is one of the main features of naturism prose. Everything is immutable and everything is repeated. No real, historical time is defined. It is this closed, even claustrophobic space of time that foreshadows its tragic nature. The tragic dimension of confinement points to the inability to break free from human condemnation. Within the framework of cyclicality, it is necessary to focus on sacred time and myths from the point of view of the profane-sacral.

2.1. The Dragon in a sign of fire

The symbolism of the elements occurs in both profane and sacral understandings. The fire symbol may indicate a misunderstanding and disapproval of the main character. Even a person sometimes loses control of a fire, just as the figure of an outcast cannot be tamed or conquered or understood in any way. Fire from ancient times foreshadowed something burning, something that supplies an element of energy. In Christianity, the symbol of fire is a sign of the Holy Spirit. In the event of a fire, we must distinguish between concepts of ignition and incineration. Something is ignited in us or we are passionate about something is perceived more from the positive side. From a religious point of view, the Holy Spirit can ignite in us, which, like fire, cannot be grasped. It's something that blows in any direction without our control. In connection with the analysis of the work *The Dragon Returns*, the symbolism of fire is projected in a negative sense. In terms of combustion, burning and the resulting unrest. In Christianity, this term can also be seen as burning, burning

or mining. Most often in connection with sin, which is undesirable and must be removed. Superstitions and symbols regarding fire are known in pagan mythology. It was not allowed to be borrowed or transferred on 13th December. There was a strict ban on handling fire and approaching the furnace [7]. Fire in this context is further understood as a means of defense. A protective ritual originating from the ancient Celts is well known. The person who wants to protect himself should sit in front of the fire and imagine how the fire surrounds him with a protective light and creates a barrier. To amplify, it is necessary to use a ritual formula: "*Let the magic in the fire woven around me stand out and surround me with its radiance as a protective wall. No one will cross that wall. No one will pass through it. No one will find a joint in it* "[8]. In connection with the given understanding of fire, we state that the choice of the symbol of burning fire and flames, which is associated with the Dragon, was not accidental. A barrier is created between the Dragon and the villagers, which serves similarly to fire protection.

The Dragon is thus isolated from others, which further emphasizes its individuality and relationship in opposition to the collective. Rituals and superstitions related to fire and specifically to fire chains are also preserved. These take the form of either a fireball or a snake. The connection with the snake, which foreshadows evil forces, is also transferred to the visual form. In addition to having a black band taped over his eye, the Dragon has a snake-shaped scar on his face. Again, a visible negative symbol and a reference to the determination of its fate. The relationship between the symbol of fire and the ball of fire is a frequent motif in several recorded narratives. Rarašek, rarach, rarig in Ukraine and rarog or rach in Russian areas are sometimes called fiery. The image of the fireball is genetically linked to the ancient Slavic god of fire, Svarog or Svarožič, mentioned in Russian and Baltic annals. In our Slovak realities, the occurrence of the fiery phenomenon is attributed to an evil spirit. A fireball or fire snake has an exclusively negative character [9].

The specific reference to the Old Slovak past cannot be overlooked even in connection with our research context. From the above, it is clear that the motif of fire in connection with the work is perceived as negative. The character of the Dragon thus appears in a negative light and is evaluated negatively. The choice of an element such as fire symbolizes the deep connection of man with the landscape and nature, characteristic of the whole prose of naturism. Understanding the natural rhythm, cyclicality and awareness of one's own dependence on nature is another dominant element occurring in the works of the authors of the period. Almost the entire work is marked by Christian-pagan opposition and is shrouded in mystery. It is explicitly expressed through a village that acts as a collective consciousness – one soul. By the behavior and words of the villagers, superstitions, prejudices, curses, but also the fear of God's ubiquitous punishment come to life. In this example, it is best to see the split, resp. opposition in people's thinking. Faith in superstition on the one hand and faith in God on the other. Despite this discrepancy in people's thinking, the village still stands out as a whole. He decides on guilt and punishment and often acts as an individual through his behavior.

3. Conclusion

The prose of naturism gives the impression of a direct attitude towards nature, the village and unadulterated feelings. It is behind this direct attitude, expressed explicitly, that hides the inner form of the prose of naturism, which is based on the oppositions of good and evil, life and death, birth and extinction, profane and sacred. The individual oppositions do not create contradictions, but on the contrary form a unified whole, which is attractive for its ambiguity. In the study, we focused on the meaning and symbolism of fire, cyclicality of time, myth, sign-aesthetic depiction, Christian and pagan motifs, ambivalence of characters, the opposite of good and evil and archetypes, which are symbolic classifications in the form of semantic oppositions in the literary work. became a model for film processing.

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THE DEFINITION AT THE BRINK: GUERILLA FIGHTERS OR TERRORISTS? CHECHNYAN CASE: ROLE OF RELIGION AND FRUSTRATION

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Abstract: *Terrorism remains a worldwide issue the states are combatting against. The crucial factor where states often fail seems to be identifying the causes or incentives the terrorism is stemming from. Also, the definition of terms as guerilla fighters, terrorists, and others is often blurry, and for some, they overlap. Thus, the paper brings the analysis to distinguish the terms guerilla fighters and terrorists, emphasizing the causes that can lead from guerilla to terrorism. Remarkably, the paper uses Chechnyan wars, which represents appropriate cases to show the differences in the terms, possible developments in movements, and their causes. The Theory of Frustration-Aggression guides the research as the main theoretical framework. Further, the paper clarifies the key terms, so subsequently, the author carries out the analysis based on the process-tracing approach when he was monitoring and evaluating the events and process within the Chechnyan issue. The paper concludes that the uncomplimentary environment with prevailing frustration might lead to religious recruitment that offers another solution for an unpalatable situation. With this in mind, the theory is a possible explanation for the terrorists' actions. Lastly, the paper provides the tine line between guerilla fighters and terrorists.*

Keywords: *terrorism, Chechnya, religion, frustration*

1. Introduction

The non-state violent actors can engage in different positions in our perspectives; however, the differences can be hardly distinguished. Terrorism has often used the term with plenty of its definitions. This research is purposely trying to elaborate on the fragile line between terrorism and guerrillas freedom fighters on a study case in Russian Federation that emerged during the last century and continued in the current one.

Chechnya remains the thorn in the Russian Federation's side that caused massive troubles for President Yeltsin, and the territory stays until nowadays highly unstable and unsafe. However, Chechnya remains a part of the Russian Federation. The inquiry's primary goal is to expose the thin line between guerrilla fighters and terrorists in the Chechnyan case. The author states that Chechnya nationalist movements changed from ethnic-nationalist guerrilla fighters to the terrorist group, and the author indicates the three particular reasons, which are going to be analyzed, and tested. First, the guerrilla fighters can quickly become terrorists once they are not able to reach their goals. As Mareš professes, the guerrillas are even using terrorist tactics as a small component of their methods [1]. Therefore, they can switch entirely without more enormous obstacles, adapt different tactic doctrine, and aim at different targets due to frustration. However, this mechanism can work conversely and emphasized by Hoffmann that the categories are not rigid; however, they overlap [2].

Moreover, the author argued that the religious fighters coming out of the ethnic / nation, or the territory, and are motivated by the religious incentives can ruin the desired state of the ethnic-nationalist movements. Lastly, the ongoing events in the world, society is influencing the labelling of violent groups. The hypothesis earlier mentioned will be tested.

From the above mentioned, the theory of frustration-aggression constitutes the main backbone. Crucially, the research works with one particular concept by Richardson. Richardson's concept of terrorism defines the following seven points applied to how the Chechnyan fighters consecutively fulfilled the concept with their deliberate actions and shifted their status [3].

Political; Violent; Send a message; Symbolic (these days threatening 'our freedom'); Non-state; Victims not same as audience; Civilian targets

The paper is structured consecutively. After the introduction, the reader gets familiar with the theoretical and conceptual framework that supports the analysis. The analytical part contains two chapters dedicated to the conflict's background and two wars that emerged. The second chapter exposes the second Chechnyan war and its outcomes. These two analyses should provide a sound base for answering the research questions since they deliver a holistic package of information. The last chapter concludes, where the author will summarize the study's findings and declare the answers.

2. Theoretical and Conceptual Framework

2.1 Theory of Frustration-aggression

The leading component of the current research paper is the Frustration-aggression theory or hypothesis that states "the occurrence of aggressive behaviour always presupposes the existence of frustration and, contrariwise, that the existence of frustration always leads to some form of aggression" [4]. The core theoretical aspect is that the

frustration does not represent the emotional state; however, the observable event identifies the causalities [5]. Therefore, the frustration event, its existence, concludes its aggression. However, Breuer and Elson, like other scholars, are emphasizing that aggression is not inevitably the only outcome of frustration, and there is the existence of several possibilities [5]. Nonetheless, the theory has to be understood in conditions on the study case that represents the bloody fighting with several aspects elaborated on later in the chapter. The case itself implies the uncertain environment's characteristics with tremendous pressure on human beings involved in the Chechnyan conflicts. Thus, the expectation of aggression is different than in Breuer- Elson's case of a basketball match of yelling a player at a referee [5]. However, the case applies the theory on the outcomes of the second Chechnyan war and Russian invasion into Chechnya and its result for Chechnyan guerrilla fighters, at least, guerrillas fighters.

Furthermore, Dollard, Doob, Miller, Mowrer, and Sears say that the aggression does not have to be deliberately aimed at the source of frustration, but it can be directed against innocent characters [4].

The study applies the theory on the period of the Second Chechnyan war, losing the independence, and hard strikes by the Russian Federation that created frustration and resulted in aggression that led from guerrilla fighters nature to terrorist nature of Chechnyan fighters. As the experts earlier mentioned, the variables as the likelihood of achieving the goal and the distance of the goal are playing an essential role in the theory, and they seem to be significant even in the researched case, when from partly gained independence, the republic of Chechnyan suddenly was found far away from the desired state.

2.2 Richardson's concept of terrorism

The term "Terrorism" remains ambiguous, although it is not a new phenomenon. Many experts have attempted to define and conceptualize terrorism; however, one firm concept or definition exists. The researchers, nevertheless, often find consensus on several points. The current study paper utilizes Richardson's concept to include the most mentioned factors of terrorism. Richardson is claiming that terrorism has specific characteristics; the points mentioned in the introduction [3]. Political goals, when the groups are targeting the civilians deliberately for political purposes. Secondly, the fundamental aspect represents the violence which is connected with the third point of the message. The goal of terrorists is not to defeat the enemy. However, they want to deliver the message what, consequently slippering into point four, that act or victims have symbolic significance. The fifth point states that terrorism is linked to non-state actors. However, this could be arguable. The last two points are connected again with the victims. The victims are different from the audience. Victims are most often used to reach the government's interest, and lastly, the terrorists are targeting the civilians as innocent actors.

On the other hand, the guerrilla fighters are an irregular army fighting against the regular state forces, and they have a firm structure that enables them to conduct quasi-military operations [3]. Therefore, their capabilities and number of fighters are often much higher in comparison to the terrorist. Richardson concisely emphasizes that even guerrillas can target civilians; however, it happens just occasionally [5]. Although the terrorists do it deliberately and only occasionally striking the security forces. In addition, Richardson claims that terrorism appears as the last option or lacks the options to tackle the opponent and reach the goal. This corresponds with the theory primary assumption of frustration that will be elaborated later in the analytical chapters. Lastly, Stephane Lefebvre asserts that the ethnic-nationalist/separatist groups seek to gain power within their territory or achieve political autonomy [6]. Thus, they have clear goals in comparison to religious terrorists. Moreover, Lefebvre states that religious terrorists execute more mass casualties since they are more messianic and apocalyptic. "They are not seeking more political autonomy, independence or to prevail over a dominant ethnic group…"[6].

3. From the first to the second Chechnyan Conflict

The history of tensions and disputes among central Russian governance and Chechnya has long historical roots. Chechnyan people have never seen themselves as part of Russia, whatever establishment ruled over the Russian territories. However, the USSR's disintegration entails an exceptional opportunity for Chechnya in the sense that they could finally declare their independence during the year 1991. The reorganization of the USSR should transform fifteen states into more than eighty. However, Chechens' leaders refused to sign the federal treaty. This step brought a significant dispute between president Yeltsin and officials in Chechnya. To continue in the independence efforts, guerrillas were operating in the whole territory with clear aims, hit the Russian federal forces. The motives stand for political issues. However, there were not deliberate attacks against Russian civilians in Chechnya or even out of the Chechnyan territory. Therefore, during the first war in Chechnya, the fighters were more labelled as guerrilla forces that even correlate with their tactics that appeared successful in the end, which can be demonstrated with the Battle of Grozny when Russian forces suffered heavy losses. Therefore, the Russian forces did not achieve the goal to restore the constitutional order over Chechnya, and they withdraw in 1996 after the humiliating defeat [7].

Despite Chechnyan fighters' achievements that were significantly supported by Muslim communities worldwide, which even sent the fighters to Chechnya, the fighters left the first sign of terrorists' behind. In June 1995, the group of fighters led by Shamil Basayev seized the hospital in Budyonnovsk, where they hold over 1 000 hostages. The casualties reached hundreds of dead and injured civilians, hostages included, and Russian army forces and Chechen rebels [8]. The pivotal attack's purpose was to launch the peace talks among Russian and

Chechens; in other words, Chechens wanted to force Russians to stop their campaign and negotiate peacefully about Chechnyan status [9]. For the first time, the Chechen rebels aimed deliberately at civilians that did not represent the audience.

4. Second Chechnyan war, and its outcomes

Although Chechnya partly achieved its goal in the first war, the country remained strictly isolated due to Russian measures. The previous military operations and subsequent isolation accumulated several burning issues within the country. The republic of Chechnya found in chaos, where the law was not successfully applied. As Walt stated: "Part of the problem is that revolutions create great uncertainty, which in turn fosters miscalculation" [10]. The scenario, similarly, has brought a lot of miscalculations or different unexpected outcomes.

Moreover, Chechnya did not find the endorsement nor even backing from the international community, where Russia's stability as the continuator of the USSR was the primary goal. Thus, the warlords gained more power than the political leaders, and the political situation even boosted the warlords' activities. High unemployment and no vision of any future kick up the radicalization of young men in Chechnya by Islamic leaders that came during the first war. Generally, isolation and previous operations provided fertile ground for foreign Wahhabists that trained local inhabitants.

Moreover, they were bringing the only financial resources into Chechnya [11]. Therefore, the Islamic faith gained tremendous power, even in politics. The recruitment's fruitfulness was created by the overall conditions that had been prevailing in Chechnya. "Chechen president Maskhadov was overwhelmed by socioeconomic challenges, abandoned by the Russian Federation and the international community, and compromised by his inability to monopolize the fractured military forces that fell increasingly under the influence of Wahhabi extremists who provided ideological and economic support" [11]. The instability, uncertainty and overall unpalatable conditions resulted in the enormous ambition of former guerrilla groups that attacked the federal republic of Dagestan that was part of the Russian Federation. The Islamic leaders claimed the war against the unbelievers and seized several villages. The holy war should result in an independent Dagestan. Crucially, the raids were conducted by Islamic fighters operating from Chechnya. Reports claimed that the attacks were executed by warlords Khattab and Shamil Basayev, who had rich combat experience from several religious conflicts [12] [13]. In comparison to Basayev, Khattab was not a Russian citizen; however, he participated in Chechen Wars. Both Basayev and Khattab established the Islamic International Peacekeeping Brigade that included religious fighters from several Muslim countries.

Unfortunately for Chechens fighters, the former agent of secret agencies, Vladimir Putin, was appointed as the new government leader. He set up a typical Russian tactic on dealing with the most significant contemporary threat for the Russian Federation and its sovereignty. The attack provided the incentive for launching the anti-terrorist campaign in Chechnya. Russian Federation used, as the previous war, all components of warfare referred to as the 3D warfare generation, and this time the Russian forces were much more efficient and destroyed the guerrillas' fighters remarkably fast. Vladimir Putin applied a more harsh approach towards Chechens rebels and the state itself. Satter stated that the full-scale attack and normalization tendency is a typical old-Soviet tactic [12]. Besides the War in Dagestan, Chechens blasted several apartments in Russia. During the incidents were more than 400 civilians hit, injured or dead combined. Nonetheless, the conspiracy about Putin's inside action, who a few months later became president, is still alive.

After the Russian Forces restored the constitutional order in Dagestan, they finally launched the operations in Chechnya, where they later captured the specific strategic points and Grozny as the capital city. Nevertheless, the reports show that both sides are responsible for crimes as they violated international humanitarian law. The Russian advance was accompanied by massive air support and artillery support that combined caused enormous casualties among the civilians or led to massive immigration from affected territories [14] [15]. Notwithstanding, the total civilian losses are difficult to calculate as the numbers released by Russian federal sources do not correlate with the numbers from separatists' numbers, but the numbers reached, indeed, hundreds of thousands of human beings. The battle-phase lasted only for several months between the years 1999 and 2000.

The overwhelming offensive campaign launched by Russian forces concluded in Russian control over the Chechnyan. Vladimir Putin, already a president of the federation, negotiated and appointed new leaders in the Republic of Chechnya who will be loyal to him and Russia, currently Kadhyrov junior. With this particular step, Chechnya lost its ambition to be an independent state partly achieved during the first war. Moreover, the drastic Russian campaign included an indiscriminate approach to Chechens when even tortures took place. The frustration by acts that happened in previous months and years brought the first terrorists' raids aimed against Russian civilians out of Chechnya, and those included even the children. The rebels hit, similarly as during the first war, the school in Beslan what probably stands for the most unacceptable known action conducted by Chechens fighters, terrorists. The Beslan massacre happened on the first day of school in September 2004, and the dramatic event continued for the next three days until Russian federal forces stormed the school The carnage left behind hundreds of dead, majorly the children. Although there is an enormous criticism of the Russian action, concretely, its tactics should conclude in many innocent casualties. Chechens claimed their responsibility for the terrorist act, where the demand was identical with the first terrorist

event conducted by Chechens in 1996, the independent Chechnya [16].

From Chechen conflict has emerged one of the recent phenomena, thus, the women's participation in the terrorist attacks. Two female suicide bombers killed over ten people in Moscow [3]. Also, another female bomber blasted herself nearby the Russian military bus near Chechnya [17]. There is an existence of an extraordinary unit in Chechnya. "There is a special unit of the Chechen terrorists called the "Black Widows," made up of women who become terrorists once their husbands are killed" [3]. The martyrs aimed to revenge the atrocities that have been executed against the Chechens' community [3]. These attacks evoked the great condolence of the world actors.
Nevertheless, the list of attacks is much longer. The Chechens hit twice the Moscow airport of Domodedovo, when first, during 2004, they achieved to destroy two aircraft, and later in 2011, they killed tens of people and injured almost two hundred. Furthermore, they strike on Russian railways or subway in Moscow [18].

Even though the Russian Federation announced that they re-established the constitutional order over Chechnya, the federative republic remains still the hot spot in the Russian integrity security. The high unemployment is still prevailing, although the territorial budget is filled massively from the federal treasury. The kidnapping, murders and other unpalatable events are still daily. However, it does not currently jeopardize national security. Moreover, if we consider the issues that Russia has to tackle nowadays, mainly regarding the financial resources, it might negatively impact Chechnya for further stability and, therefore, Russian stability. Lastly, even the Chechens fighters are/were receiving worthy experience in these ISIS territories what can be later reflected in the Caucasus again as it was during the 90s' and gained experience in Yugoslavia.

4. Conclusion

The study paper should expose which role played the frustration in the Chechnyan conflict and the religious fighters. The religious fighters ran by the caliphate's idea fetched the Chechnya in the second war against the Russian Federation that meant catastrophic consequences for their independence. However, the Islamic fighters' support was rooted in the republic's uncomplimentary situation after the first Chechen war. The Islamic groups with their warlords found the fertile group for recruiting the young people without future caused by inefficient governance so, therefore, the religious group became more powerful than the country authorities. The subsequent war, where Russia took control over Chechnya again with Vladimir Putin in charge, meant no more extended independence ambitions for Chechnya, and the frustration with no possibilities concluded in the last option attacks: terrorist attacks. Chechnyan terrorist cells started to target the Russian civilians in Moscow, Petersburg, etc. The group of "Black widows" most probably represents the best example of frustration acts. Chechens fighters turned from guerrillas fighters into terrorists by the time. The executed events fulfil Richardson's concept of terrorism. The Chechens stand up for the political motivates since the beginning as they strived for independence. The violence became the nature, and most probably the accepted tactics as the answer of the Russian forces tactics, exponentiate by the frustration after the second war. The other two points are connected with the frustration, thus, with the strikes against the hospital or school in Beslan plus the apartments bombing in Russia that could stem from the frustration of the poor conditions in Chechnya caused partly by extreme isolation. The fighters, definitely after the battle phase, acted as the non-state actors if we will accept the short Chechnyan independence before. The last two points are already included in earlier sentences, and they stand firm without doubts.

The study shows that the uncomplimentary environment where the frustration is prevailing could provide fertile soil for recruiting by religious groups and concludes in unwished events that can deteriorate long term sustainability and relations as we see that territory of the federal republic of Chechnya is not stable until nowadays and the kidnapping, small terrorist attacks and organized crime is flourishing there.

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